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AMERICAN ANTIQUITY

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EARLY MAN IN CALIFORNIA AND THE TRANQUILLITY SITE

GORDON W. HEWES

A BRIEF note in *Science*[1] in the spring of 1943 reported the find of an association of human burials and artifacts with the remains of *Camelops*, *Equus*, and *Bison*, near Tranquillity, Fresno County, California. The present paper is a more detailed description of the cultural remains and a fuller report of the writer's findings at the site prior to 1944. Excavations in that year by the University Museum, University of Pennsylvania, are mentioned below. They will be described in a forthcoming paper by Lloyd and Satterthwaite, to include a critical examination of the evidence for and against the contemporaneity of the human and extinct mammal remains.

In 1939, while on a reconnaissance archaeological survey of the central San Joaquin Valley for the University of California Museum of Anthropology, William C. Massey and the writer first visited the site, staying only two days. Three burials which had been exposed by wind and water erosion were removed, and a surface collection of artifacts was made.[2] The condition of the bone material, human and animal, which was strikingly mineralized, led to further collecting trips in 1940 and 1941. A fourth burial was found in October, 1941, along with mammal bone later identified as belonging to the extinct genus *Camelops*. The site was revisited by the writer, his wife, and Mr. and Mrs. William C. Massey, after the identification of the *Camelops* material was made known, on December 7, 1941. The entrance of the United States into the war at this time disrupted plans for further work on the Tranquillity site, and it was not until August, 1942, that a final visit was undertaken by the writer. The 1942 collection included the well-preserved mandible of a *Camelops* embedded in a hardpan matrix, along with bones identified as belonging to *Equus* and *Bison*. Although the total time spent on the site prior to 1944 was short and no excavation into undisturbed deposit was attempted, the number of artifacts and other specimens is considerable.

In April, 1944, a group from the University of California at Berkeley, including E. W. Gifford of the Museum of Anthropology, R. A. Stirton of the Department of Palaeontology, Carl O. Sauer of the Department of Geography, and Arden King of the Department of Anthropology, examined the site and made a small surface collection. From May 13 to June 6, 1944, the University of Pennsylvania Museum, in cooperation with the Museum of Anthropology at Berkeley, carried on carefully controlled excavations in an effort to determine whether or not the extinct mammals were contemporaries of man at the site. Dr. Linton Satterthwaite, Jr., of the University Museum in Philadelphia, and Mr. Malcolm Lloyd, Jr., of Philadelphia, took part in this work. The writer regrets that work in Washington made it impossible for him to participate directly, although he was enabled, through the cooperation of the University Museum, to participate indirectly in the excavation through study of the records, plans, cross sections, and photographs.

The site lies on the open plain in the central trough of the San Joaquin Valley, about 24 miles west of Fresno and approximately halfway between San Francisco and Los Angeles. As shown in Figure 26, the small town of Tranquillity lies about 2½ miles southwest of the site. Fourteen miles west are the Diablo Range foothills, a part of the Coast Range; thirty-five miles east, beyond Fresno, are the foothills of the Sierra Nevada. The landscape in the vicinity of the site lacks perceptible natural elevations. Between Mendota, where the San Joaquin River flowing west out of the Sierras bends northwestward, and the summit of the low alluvial lobe which divides the San Joaquin

[1] Hewes, 1943.
[2] Hewes, 1941.

River basin from the Tulare Lake basin, the change in elevation is only forty-five feet. The elevation of the site itself is about 165 feet above sea level.[3]

The archaeological deposit occupies the upper portion of an old valley-filling soil which has developed a calcareous hardpan, identified

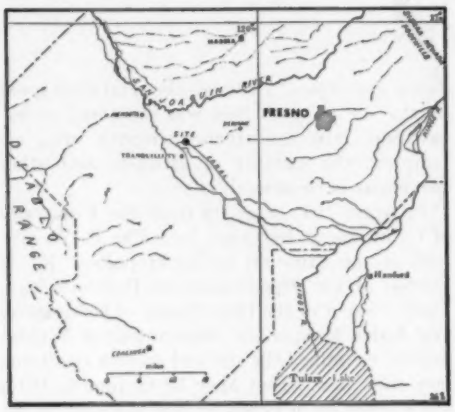

FIG. 26.—Central San Joaquin Valley, California, showing location of Tranquillity site.

by soil scientists as typical Fresno Hardpan. The soil consists of clay loam and fine sand, and has no natural inclusions of rocky materials. Under pre-agricultural conditions, prior to the introduction of irrigation in the last century, drainage was stagnant and poorly defined. The valley trough receives overflow from the Kings River to the south, which ordinarily drains into Tulare Lake basin but which may flow northward through marshy country to join the San Joaquin River system when the water level in Tulare Lake basin is higher than the alluvial barrier. For the past seventy-five years, surface waters have been subject to artificial control, with increasing diversion into the canals and ditches of irrigation districts, so that the flow of water in the vicinity of the site and the resultant erosion and sedimentation can be attributed to modern agricultural activity.

Summers are extremely dry, annual rainfall averaging about six inches; the soil becomes very hard, and there is wind erosion of barren surfaces. Climatically, the region is quite similar to the Mojave Desert.[4] The vegetation is salt desert shrub except in the sloughs. A few willows and cottonwoods grow along the canals, but there are no oaks visible for about five miles in any direction, and there is no reason to suppose that any oak groves have been cut by the modern inhabitants. If acorns were a staple in the diet of the people who occupied the site, as they were in the diet of the historic Indians of central California, a vegetational change may be indicated for the area.

Superficially, the occupational and burial deposit is not sharply differentiated from the surrounding soil. The original limits of the occupation area are further obscured by the canal and levee on the south side. The canal, shown in Figure 27, is the main by-pass for Fresno Slough (Kings River Slough), which flows northwestward to the San Joaquin River. It rejoins the slough proper about two miles northwest of Tranquillity. The canal had existed for several decades before the building of the second levee, north of the site, which parallels the canal for a short distance. The north levee is apparently well outside the area of aboriginal occupancy.

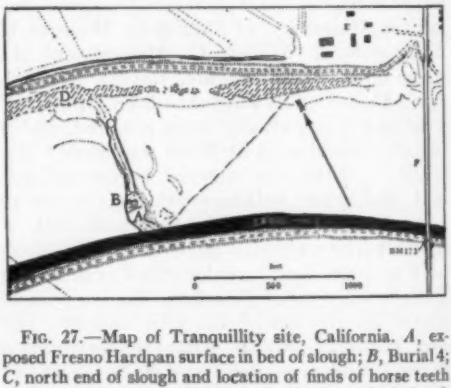

FIG. 27.—Map of Tranquillity site, California. *A*, exposed Fresno Hardpan surface in bed of slough; *B*, Burial 4; *C*, north end of slough and location of finds of horse teeth in juxtaposition to obsidian chip; *D*, area into which slough flows during high water in canal; *E*, ranch buildings; *F*, bridge over Main Bypass Canal.

In 1937–1938, with the building of the north levee, a sluggish northeastward flow of water established itself when the canal was overflowing and began to cut a shallow channel or "slough" across the archaeological site at *A* and *B* on Figure 27, continuing into the depression

[3] For the topography of the area, see the Jameson Quadrangle, United States Geological Survey, and Figure 26, which shows the location of the site in relation to geographic features of the Central San Joaquin Valley.

[4] Russell, 1926.

at *D*. From 1939 to 1942 this cross channel or slough had cut to a depth of about 30 inches in the artifact and burial deposit. The reported exposure of archaeological material in this cut led to the investigation of the site in 1939. At that time there were small bare areas considered to be the results of scraping. When interviewed by Satterthwaite, the former owner conceded that some of them might have been so caused but stated that others occur where this explanation is not applicable.

The top 30 inches of soil were cut as shown in Figure 27, exposing large sections of the Fresno Hardpan up to 60 feet in width; in other sections of the channel, or slough, either there is no underlying hardpan or it lies deeper than the present bottom. The chief occurrences of human, artifact, and faunal remains were (1) on the exposed Fresno Hardpan surface, 30–35 inches below the general land surface, onto which stone fragments, human and animal bone, and occasional artifacts appear to have been precipitated from the softer sand and loam soil which washed away; (2) in the soil, above the level of the hardpan, some in situ in the habitation and burial deposit and some in disturbed, redeposited soil. On Figure 27, *A* marks the center of concentration of the artifact and bone collections and the exposed surface of Fresno Hardpan.

Three burials and many artifacts were found practically exposed, within a few inches of the general soil surface, mainly on the east side of the slough to the east of *A*, during the first visit to the site in 1939. Subsequent finds have come from lower surfaces or from excavation into the deposit. A fully articulated burial, designated as No. 4, from a level slightly below that of the Fresno Hardpan but in a section of the slough where that formation does not exist, indicates that human disturbance of the soil reached the depth of the hardpan. This burial came from the point marked *B* on Figure 27, just below the west bank of the slough. Further evidence of the depth to which the native occupants of the site penetrated was found in a clearly defined circular pit extending down through the hardpan layer and into the underlying sand and clay soil. Traces of charcoal appeared in the deposit which filled the pit, indicating that it may have contained hearth refuse.

The bared surface of the hardpan was littered with minute fragments of flint, chert, and obsidian, other splinters of stone and bone, and a few pieces of fire-reddened clay; vermiform calcareous concretions, some of considerable size, also lay on the exposed hardpan. No artifacts, bone, or fragments of rock appeared beneath unbroken hardpan in the subsoil which was examined; it is presumed, though not verified by extensive removal of the formation, that the hardpan marks the lower limit of the archaeological deposit.

The faunal remains, heavily mineralized—a condition also characteristic of the human skeletons—are the most striking feature of the collections. Almost all bone, including artifacts of this material, has remarkably increased density, increased hardness, and a purplish-gray to nearly bluish-black color; mineralogically the replacement is collophane, a form of calcium phosphate. The fauna identified includes the following:

1. *Camelops* (sp. indet., probably *hesternus*): two mandibles, an astragalus, and fragments of teeth.[5] Camelid identification was made from the astragalus by Dr. Chester Stock of the California Institute of Technology, Pasadena, in 1941. The mandibular material, obtained later, enabled Dr. R. A. Stirton to make a tentative generic identification of *Camelops*, probably *hesternus*. These finds came from the upper surface of the hardpan layer and from disturbed soil above it, 30–32 inches below the present land surface and near the base level of the recently eroded slough. The best-preserved mandible of *Camelops* is apparently adherent or "cemented" to the Fresno Hardpan matrix in which it was removed. In small crevices of the exposed upper surface of the mandible there are calcareous inclusions, which would lead to the assumption that at one time the specimen lay more deeply embedded than at present. As a result of recent examination of this specimen, a soil scientist suggests that the hardpan had not reached its present state of hardness when the jaw was deposited; at any rate, the hardpan did not antedate the jaw.[6] Within 10 inches of this mandible there were small fragments of stone, apparently belonging to the archaeological deposit. None of the *Camelops* remains occurred in the immediate vicinity of human burials, but artifacts, including points, were found within a

[5] These and other faunal remains are in the University of California Museum of Paleontology, catalogued from locality V4401.

[6] Letter, February 14, 1945, from Hans Jenny, Division of Soils, University of California College of Agriculture.

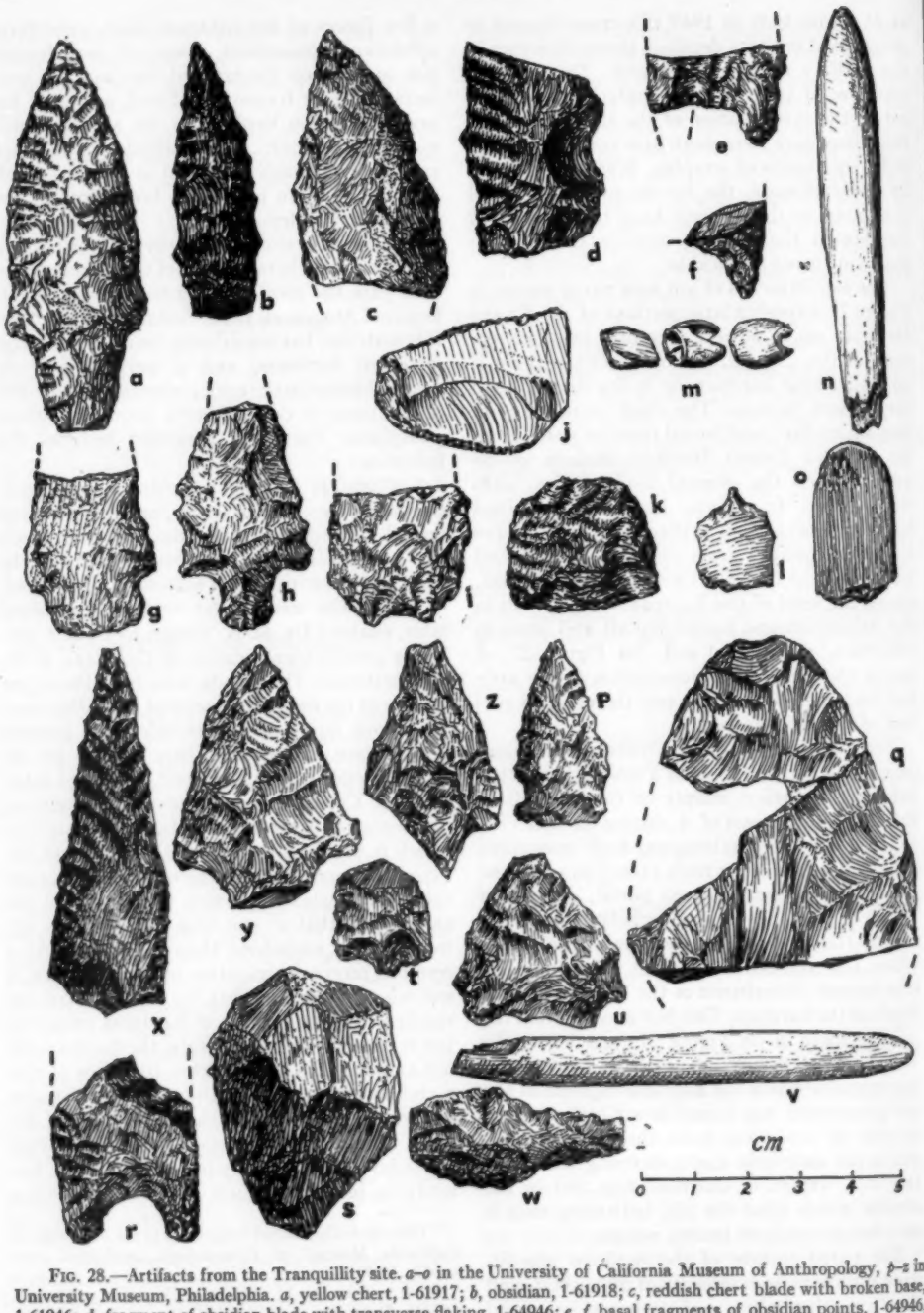

FIG. 28.—Artifacts from the Tranquillity site. *a–o* in the University of California Museum of Anthropology, *p–z* in University Museum, Philadelphia. *a*, yellow chert, 1-61917; *b*, obsidian, 1-61918; *c*, reddish chert blade with broken base, 1-61946; *d*, fragment of obsidian blade with transverse flaking, 1-64946; *e*, *f*, basal fragments of obsidian points, 1-64946, 1-64622; *g*, fragment of schistose point, 1-61920; *h*, fragment of brown chert point, 1-61919; *i*, basal fragment of reddish

thirty-foot radius on the exposed hardpan.

2. *Bison*, perhaps of the modern species, is represented by an orbital fragment and some tooth fragments. While bison were unknown in the region in historic times, their remains have been found in archaeological sites on Buena Vista Lake, at the south end of the valley.[7] This suggests fairly recent survival of bison in central California.

3. *Equus* is represented by tooth fragments whose condition makes specific identification impossible. One fragment of a horse's tooth, together with stone and bone materials, lay on the surface of the hardpan not far from the place where the *Camelops* mandible was found. Some remains of horses' teeth were found in juxtaposition with small obsidian chips in sandy soil at the north end of the slough channel, marked *C* on Figure 27. Remains of *Equus* had acquired the color which is characteristic of the other bones and teeth and which apparently results from the process of mineralization at this site. It is, of course, possible that the horse remains belong to the period of white contact and are no older than the late eighteenth century; if so, they are the only recognizably recent intrusions into the cultural material, which lacks the broken glass, ceramic beads, and traces of iron objects which are encountered on sites of the contact period in the San Joaquin Valley.

4. Other identified remains of mammals include *Cervus nannodes* (tule elk), *Antilocapra americana* (American antelope), *Canis* sp. (dog or coyote), *Urocyon cineroargenteus* (gray fox), *Taxidea taxus* (badger), *Lepus californicus* (jack rabbit), *Scapanus* sp. (mole), and *Thomomys bottae* (pocket gopher). The remains of badger, jack rabbit, pocket gopher, and fox may be those of animals which died in their burrows, but it is highly probable that the bones of the larger mammals were brought together as the result of human hunting activities.

5. A few small and unidentified fragments of bones of birds, turtles, and fish were collected. The paucity of bird bone, as well as the absence of artifacts of this material, is curious, considering the numbers of waterfowl in the region. If the site were occupied when tule marsh conditions prevailed, birds would have presumably formed an important part of the diet of the inhabitants.

Human skeletal remains at the Tranquillity site can be separated into material from articulated, intentional burials which retain their original positions and material from disturbed burials, scattered by erosion of water and wind, probably within the last few years. Five skeletons were found in a relatively undisturbed condition, the first three within a few inches of the present surface. Burial 4, better preserved than the rest, lay 39 inches below the present surface, at a level slightly below the hardpan layer but in a section of the slough channel where no hardpan was present. The matrix of Burial 4 was an indurated soil, not true hardpan, onto which a somewhat lighter soil seems to have been introduced as part of the burial preparation. All the burials still in position were semiflexed, but there was no uniformity in their orientation. Artifacts occurring in burials were few. There was a point with Burial 1, and a fragment of an obsidian point may have been associated with Burial 2. From Burial 3 came a fragment of polished, worked bone, and from Burial 4, a chipped flake of chert. With some of the scattered skeletons not designated by burial numbers there were a total of fifty-six obliquely lopped beads made from *Olivella* shell, five spire-lopped beads from the same species, and one disk bead of clamshell 10 mm. in diameter.

All except Burial 5 lay in an exposed or partially exposed condition prior to removal. Only Burial 5 was excavated from an undisturbed surface; a detailed description of this burial will appear in the report of the University of Pennsylvania Museum. As stated previ-

[7] Wedel, 1941, pp. 10–11.

chert point, 1-64946; *j*, yellowish chert scraper 6 mm. thick, worked one side only, 1-51576; *k*, obsidian scraper 7 mm. thick worked both sides, 1-64946; *l*, schistose drill, maximum thickness 3 mm., 1-61922; *m*, three of fifty-six obliquely end-lopped *Olivella* shell beads associated with burial, 1-51182; *n*, bone point, broken at base and scratched around tip, elliptical cross section, heavily mineralized, 1-51176; *o*, fragmentary highly polished spatulate bone artifact associated with Burial 3, 1-51181; *p*, pinkish stone point, A51, from hard surface; *q*, fragment of gray-black obsidian blade, A2, found in hard stratum, depth 15½ inches, in Test Pit 1b, about 15 feet from position of Burial 4; *r*, basal fragment of obsidian point apparently reworked from longer blade, A32, from on or near hard surface, cf. *e* and *f*; *s*, dull black scraper, A50; *t*, brown flint, A33c, from hard surface; *u*, obsidian point, A43, from north side of slough; *v*, brownish mineralized bone point with flattish cross section, broken at base, A93, from hard surface; *w*, fragment of obsidian drill, A72, from surface of Fresno Hardpan; *x*, obsidian point, A19, from loose surface in slough; *y*, reddish chert point, A1, from loose sandy surface in slough; *z*, reddish chert point with broken base, A39, from hard surface below sand. *a–l*, *n*, and *s* are from the surface.

ously, all bone, human as well as animal, was heavily mineralized.

By arrangement with the Museum of Anthropology at Berkeley, all human skeletal remains from the site have been gathered together temporarily at the University Museum in Philadelphia for repair, study, and reporting by Dr. J. Lawrence Angel.

Cultural evidence in addition to the burials was fairly abundant, although there were, unfortunately, few artifacts with traits of "diagnostic value." Chipped stonework and raw materials were of a variety of stones: obsidian; yellow, red, and green chert; chalcedony and other flint-like materials; along with schistose and slaty substances. A few complete points, fragmentary points and blades, a drill, some scrapers, and chipped pieces too incomplete to identify make up this category of the collection. Figure 28 illustrates chipped stone items found by University of California and University of Pennsylvania parties, the latter being included by courtesy of the Pennsylvania institution. The obsidian points and blades include some with transverse flaking, but really fine secondary flaking is lacking.

Among the artifacts of ground stone are numerous roughly oval mullers (manos), two fragments of metates, several fragments of pestles, and parts of at least two mortars made from boulders with little or no finishing of the outside surface. Two flattish stones with roughly chipped side notches probably were used as net sinkers. Several quartzite hammerstones, a possible "charmstone" with grooved end, and sherds of steatite which may have been fragments of crudely finished steatite vessels were found. An unworked quartz crystal, some lumps of asphaltum, and a large quantity of broken stone, foreign to the locality, may be mentioned, although they are not artifacts in a strict sense.

Bone implements include a long dagger-like cannon bone awl; three blunt points, two of which are illustrated; two spatulate fragments with a high polish; and one awl made of the ulna of an ungulate. Shell objects, in addition to the *Olivella* beads associated with the burials and the disk bead, are represented by two cut shell pieces, one triangular, both of rather crude workmanship and about 7 cm. wide. No abalone shell was identified, although shell artifacts made from abalone occur elsewhere in the San Joaquin, appearing in abundance in the Sacramento Delta horizons as well as at Buena Vista Lake.

Lumps of burned clay, two with stick and pole impressions and one with imprints of tule leaves and of unidentified plant fibers, suggest structures or matting. No pottery was found, but its absence is not significant since it has never been reported from archaeological sites in the region or in the areas to the north except in the form of lumps and figurines.

In a consideration of the archaeology of the Tranquillity site and its possible significance in the study of Early Man in California, its paucity of in situ associations of faunal remains, artifacts, and burials cannot be too strongly emphasized. With the exception of the beads and other materials found with the burials, only one artifact (the large obsidian blade, Figure 28, *q*) can be said to have been excavated from a position in the soil which it had occupied without disturbance for a long period of time. While the large fragments of metates, pestles, and mortars presumably had not been transported very far by action of wind or water in recent years, it is unlikely that they were found in the exact position in which they were originally deposited. A large part of the site which may contain burials and faunal remains was not excavated, and, as Satterthwaite's paper will show, the presence of floodwater prevented a complete investigation of the hardpan surface on which the *Camelops* mandible was found in situ. With such incomplete evidence as is now available, it may be premature to draw too many conclusions about the site. As Satterthwaite will show in his paper, the weight of evidence from his stratigraphic work, concerned primarily with sequences of soil layers, does not seem to indicate contemporaneity of burials with at least the *Camelops* mandible found in situ on the surface of the Fresno Hardpan. Whether this is sufficient to rule out the possibility of contemporaneity of man with the other remains of *Camelops* collected at the site this writer is unwilling to say. Certainly conditions here are as favorable as those of any open valley site could be for the preservation of any evidence of contemporaneity.

The possible alternative interpretations of the Tranquillity site may be summarized as follows:

1. The remains of extinct animals long antedate the human occupancy; the association

with burials and artifacts is entirely fortuitous, and the striking mineralization of both human and other bone at the site is irrelevant.

2. The earliest human occupancy may have been contemporary with some of the *Camelops* and other animal remains, but other artifacts and burials are demonstrably later than the only in situ specimen of *Camelops*.

Other explanations, including the suggestion that human beings simply carried in fossil specimens of *Camelops* as curios from elsewhere or the suggestion that the camelid represented is not the extinct American genus but the Old World draft animal used experimentally by the United States Army in California in the middle of the last century, seem to be invalid.

At the present time it is difficult to say on which side the burden of proof for contemporaneity or non-contemporaneity should rest. In contrast to the situation in American archaeology a generation or more ago, the association of a certain extinct mammal with human burials and artifacts is no longer likely to set off a controversy; whether or not the Tranquillity site represents it, the discovery of an archaeological deposit containing indisputable human burials, bones of extinct mammals, and artifacts is definitely to be expected. Such a discovery may be made in a cave or on an open site in an arid region such as the San Joaquin Valley. In the case of the Tranquillity site, none of the elements present —extinct species, human skeletons, or types of artifacts—would be in itself out of place in a fairly ancient association. Only the proof of contemporaneity within the deposit is still missing.

In conclusion, one is safe in repeating the statement made in 1926 by Gifford and Schenck, in their pioneer work on the archaeology of the southern end of the valley, "... from the time of man's first appearance in America to the historical epoch, the San Joaquin valley has offered a suitable habitat for him, and one which has not essentially changed during this interval."[8]

[8] Gifford and Schenck, 1926.

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Washington, D. C.
May, 1945

ARCHAEOLOGY IN THE PUNTA PEÑASCO REGION, SONORA

E. W. GIFFORD

THE incentive for an archaeological reconnaissance of this region (see map, Fig. 29) by Mrs. Gifford and myself in the fall of 1944, and again for a single day in November, 1945, came from reading references to kitchen middens in the report of the conchologist H. N. Lowe:[1] "The numerous large kitchen middens at Punta Peñasco and Punta La Cholla contained thousands of these *Glycimeris maculata* with rarely a valve of the much larger *G. gigantea*. With these were quantities of the huge *Cardita affinis, Chione, Ostrea, Paphia, Cardium,* and large *Murex*. No stone artifacts or black earth were noted in any of these shell heaps. Perhaps the early inhabitants preferred their shell-fish raw." At Punta Peñasco these "middens" proved to be uplifted marine deposits which Dr. Leo G. Hertlein of the California Academy of Sciences identified as Late Pleistocene, basing his opinion on specimens and photographs.

The two headlands mentioned by Lowe (Punta Peñasco and Punta La Cholla) form the southeast and northwest promontories that bound the small Rocky Point Bay, which lies

[1] Lowe, 1934, p. 4; see also Lowe, 1935, pp. 27–32.

between Adair Bay to the northwest and Georges Bay to the southeast. The names just used are those on the U. S. Navy Hydrographic chart based on the original survey by the U. S. S. Narragansett in 1873–1875. On this chart, Lowe's Punta Peñasco is called Rocky Point, his Punta La Cholla is called

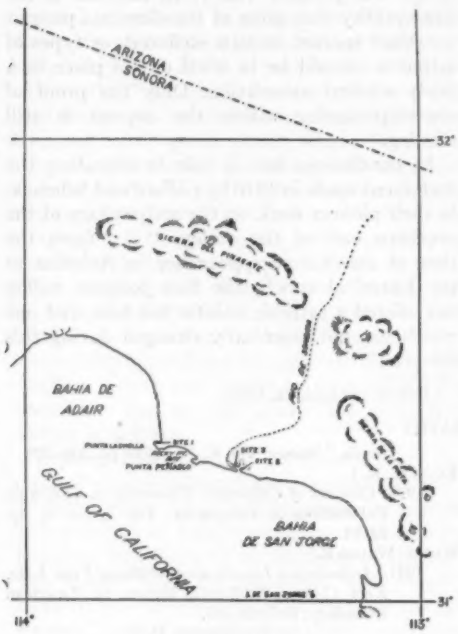

FIG. 29.—Punta Peñasco region, Sonora.

Rocky Bluff. Lumholtz[3] gives no name for Rocky Point, but designates Rocky Bluff as Sea Lion Bluff. A Mexican Government map of 1937 designates the latter as Roca del Toro. The Mexican residents at Puerto Peñasco use the names Punta Peñasco and Punta La Cholla, as did Lowe, and as I shall do in this paper.

Punta Peñasco, or Rocky Point, without trace of ancient camp sites, is a volcanic headland cluttered with lava boulders, with sandy beaches stretching away on both sides. The U. S. Hydrographic chart gives its elevation as 226 feet; on the Mexican map of 1937 it is 74 meters. For Punta La Cholla, the Hydrographic chart gives 408 feet, the Mexican map, 134 meters. Punta La Cholla is a small range of steep, rugged granite hills. The granite is very friable. Here and there it is intersected by dikes of hard, pinkish aplite. Punta Peñasco is at latitude 31°18′ north, longitude 113° 35′ west; Punta La Cholla is at latitude 31° 20′ north, longitude 113° 40′ west. Pinacate Mountain, 4235 feet high, bears north by pocket compass from both headlands.

Examination of the camp sites at Punta La Cholla and at the mouth of the Sonoita River, about ten miles southeast of Punta Peñasco, showed that they were extensive in area but not in depth, being only surface deposits. They have the appearance of material (mostly shell) left by occasional or seasonal visitors to the region who, due to the dearth of water, could tarry but briefly.

These shoreline surface deposits were near extensive clam beds, which were in *esteros* or on lee shores sheltered from the prevailing winds. Contrariwise, the exposed shores examined lacked camp deposits or, at the most, bore only scattered shell where travellers had paused to eat their supply of clams while they were still in edible condition. It is possible, too, that the visitors may have dried the mollusks for transport inland. Perhaps, too, this was a region visited for shells for the manufacture of artifacts, but evidence on this score was scant.

Samples of shells from three camp sites were collected. The species are all edible and presumably served as food for the ancient campers. Identifications are largely by Professor Bruce L. Clark and Dr. Leo G. Hertlein.

Shell Species at Sites 1, 2, and 3

Species	*Site 1*	*Site 2*	*Site 3*
Volsella guyanensis Lam.	x		x
Cardita affinis Sby.	x	x	
Dosinia ponderosa Gray	x	x	
Chione succincta Val.	x	x	x
Chione fluctifraga Val.			x
Ostrea angelica Rochebrune	x	x	x
Chama frondosa mexicana Cpr.	x	x	x
Chama buddiana C. B. Ads.	x		
Phyllonotus nigritus Meusch	x	x	x
Glycimeris maculata Brod.		x	x
Tagelus affinis C. B. Ads.		x	x
Cardium elatum Sby.		x	x
Cardium procerum Sby.		x	
Pteria peruviana Rve.		x	
Oliva incrassata Sol.		x	
Galeodes patula Brod.		x	
Turbo fluctuosus Wood.			x
Arca pacifica Sby.			x
Paphia grata Sby.			x

[3] Lumholtz, 1912, Map 2.

Until it reaches the delta of the Colorado, the

railroad line (Ferrocarril Fuentes Brotantes Punta Peñasco) from Puerto Peñasco to Mexicali, Baja California, is seldom out of sight of, or more than a few miles from, the Gulf waters. The line runs in a general northwest-southeast direction. Clam shells, evidently brought by human carriers, were observed on dunes all the way from kilometer 241, near Puerto Peñasco, to kilometer 190. Some large, broken, spiny Murex shells (*Phyllonotus nigritus* Meusch), an edible species, were observed also. Beyond kilometer 190, in the direction of Mexicali, no shell was observed, but accumulations of rusty tin cans unaccompanied by shell seen in a number of places, apparently mark camp sites of construction gangs.

To the northwest of kilometer 190 the country along the railroad becomes increasingly desert and lacks all trace of shell. Cactus, even cholla, disappears from the flora, which seems to consist principally of foot-high shrubs, about evenly divided between gray sage (?) and green creosote bushes. This northwestern desert region was much more forbidding than that in the vicinity of Punta La Cholla, or even of Punta Peñasco. Bearing on this point, cattle kept between these two places are supplied with hay, and water brought in by tank car, but they also feed on cholla cactus.

The coast to the northwest of Punta La Cholla is assigned to the Sand Papago by Lumholtz.[3] It was also visited by the Cocopa of the neighboring delta of the Colorado.[4] Ancient sherds found at Punta La Cholla were identified by Dr. Malcolm J. Rogers as belonging to Yuman I and II horizons, which suggests that the Sand Papago may be recent intruders. Additional sherds of the same types, obtained in 1945, were not submitted to Dr. Rogers. Trincheras Purple-on-red were also found on that occasion.

PUNTA LA CHOLLA ARCHAEOLOGY

Refuse of human origin extended continuously for a quarter mile (Site 1) along the north shore of Punta La Cholla, facing the Pinacate Mountains; it was observed also inland on the slopes of decomposed granite at the bases of the steep, small granite peaks. Some of the little canyons or gullies seem to afford catchment basins for rain, as attested by the cactus and bushes which grow to greater height here than elsewhere.

Inland, on the granite slopes fronting westerly toward the Gulf, I saw scattered lots of shells of *Cardita affinis* and *Chama frondosa mexicana*. A shell of *Arca pacifica* with a hole near the umbo was the only artifact of shell found. I did not discover any definite camp site, and hence have assigned no number to this locale. A chipped stone implement found is a crescentic knife or scraper made from a flake of basalt or andesite, showing a bulb of percussion but unretouched. The length across the horns of the crescent is 80 mm. The material is presumably foreign to the headland. Objects which may or may not have been used are prismatic, angular pieces of hard, pinkish aplite which occurs as dikes in the granite.[5] One of three aplite pieces collected appears to have been used to pound with, judging from the bruised condition of the end, which, however, might be due to sand blasting. It may have served to crack shellfish. No evidence of fires was seen.

Sherds from two vessels were found near the foot of a steep granite slope. One sherd (3-4884),[6] 5–6 mm. thick, is of sedimentary clay. It has a brick-red inner surface and a pale gray outer surface. The dividing line between the two colors is about midway of the thickness of the sherd. Depressions on the inner surface suggest paddle-and-anvil technique of manufacture. Its curvature indicates the sherd is from either the shoulder or near the bottom of a large vessel. Dr. Malcolm J. Rogers[7] has identified this sherd as belonging to his Tumco Buff ware of Yuman II horizon.

The remaining sherds found (3-4885) are all from a large jar which had a crude gray slip or coating on its exterior, but no painted design. Coarse, stony material is exposed where the sherds have weathered. Thickness ranges from 5 to 6 mm. Rogers states that these sherds are made of sedimentary clay and that they belong to his Black Mesa Buff ware of Yuman I horizon.

Site 1. On the north side of Punta La Cholla

[3] Lumholtz, 1912, Map 1.

[4] Gifford, 1933, pp. 261, 306.

[5] I am indebted to Professor Adolf Pabst for identification of stones.

[6] All specimen numbers cited are University of California Museum of Anthropology catalog numbers.

[7] Dr. Rogers, San Diego Museum of Man, kindly examined the plain ware and conveyed his opinions to me by letter dated March 2, 1945.

are several square miles of sheltered clam flats which are exposed at low tide. Uncounted clams indicate their presence by thousands of holes in the sand and mud. A muddy slough entering the bay to the northeast of the hills is a source of numerous mussels (*Volsella guyanensis* Lam.) and clams.

The camp site, however, is a mile away to the westward of the slough, toward the open gulf, but fronting the clam flats (Fig. 29). The site consists of surface deposits of shell on the tops of sand dunes, too high to be attributed to wave action. Examination of the sides of numerous eroded gullies demonstrated that shells were absent below the surface. Species of bivalves occurring in greatest numbers and undoubtedly serving as food have already been listed. Large, spiny Murexes (*Phyllonotus nigritus* Meusch) which had been broken open for food were also common. The species was found living on the flats exposed at low tide. A few rodents' burrows were evidenced by caving of the dune under our feet.

Stone artifacts included fragmentary lava mullers; a possible pestle, or long muller, of decomposing granite; an oval, flattish muller, 5½ inches long by 3¾ inches wide, of friable granite; a granite cobble muller, somewhat like the quartzite one pictured by Haury;[8] and one legless metate of granite about 12 inches wide by 14 inches long. Its relatively even, flat surface indicated back and forth rather than rotary grinding. A sherd (3-4897), made of sedimentary clay, was found. It was brick red in color and lacked painted design; its thickness was 4–5 mm. Rogers identifies it as Tumco Red ware, Yuman II horizon. Painted sherds were limited to Trincheras Purple-on-red ware (3-4970 to 3-4984). Some of them bore a design of close parallel lines. American fishermen, for whom this vicinity is a favorite resort and who often camp here for many days in succession, may have removed sherds in the past. There was no trace of fires, burials, or artifacts of shell or chipped stone.

Whether or not the Yuman I and II sherds found at this site and in the neighboring hills were left by ancestral Cocopa is a matter for speculation.

ESTERO OF THE SONOITA RIVER

It seemed to me that the possibility of obtaining water by digging in the lower course of the hidden Sonoita River might make the mouth of that stream a likely place for visitors from inland to sojourn, at least temporarily. Malcolm J. Rogers regards the tanks of the Pinacates as marking the more probable route from inland to the Gulf shore. Be this as it may, more sherds were found at Site 3, on the inner shore of the northeast side of the *estero* entrance, than on Sites 1 and 2 combined. This greater frequency, however, might be due in part to the fact that there are fewer modern visitors than at La Cholla Bay, since the place is inaccessible by automobile.

The *estero* appeared to have two arms, one easterly and one northerly, which were said to extend about six miles inland. The latter is said to be the one which leads to the course of the Sonoita River. The greatest amount of pottery was found at Site 3, on the eastern or northeastern shore of this arm, where it lay scattered for half a mile on the surface of dunes of sandy, pinkish-brown soil facing the north arm of the *estero*. These dunes had been dissected somewhat by erosion, revealing shells to a maximum depth of two feet in one spot. In front of these dunes was a narrow strip of salt marsh, behind them, lower desert. Many miles away, across the desert, were to be seen the Pinacates and other ranges.

The northwest head of the *estero* entrance was of high sand dunes, which were examined about a half mile northwest of the entrance. Traces of shell, but no sherds, were seen. It was evidently a less favorable locality, being too far removed from clam flats.

Sites 2 and 3 contained burrows of rodents;[9] this was especially true of Site 3, which was of sandy soil rather than mere sand.

Site 2. Cultural material was found in lenses on the high, true sand dunes extending southeasterly from the southeast head of the *estero* entrance.

The only shell artifact found at this site was a *Cardium procerum* valve with a circular hole 5 mm. in diameter in the umbo.

Unpainted sherds of two large vessels were found. One of the sherds (3-4913), reddish-brown outside and gray inside, was liberally tempered with coarse sand but was, nevertheless, compact and heavy. It gave evidence of paddle-and-anvil technique in its fabrication.

[8] Gladwin, Haury, Sayles, and Gladwin, 1937, Plate XLVI *c*.

[9] *Dipodomys deserti*, according to Dr. Seth B. Benson.

Its maximum length was 7 inches; its maximum width, 5 inches; its maximum thickness, 10 mm.; and its minimum thickness, 5 mm. The thinner portion appears to be bottom, the thicker part, side wall.

The second large sherd (3-4914), one end of which was part of the neck of a vessel, was relatively thin for the size of the vessel. It was made of residual clay with many coarse white and black particles of granite. It was gray inside. A small portion of the exterior was brick-red, but the remainder was black and gray from the original firing. Its dimensions were about 5 by 6½ inches, and its thickness ranged from 3 mm. to 7 mm. Depressions near the thicker neck portion of the vessel and elsewhere suggested paddle-and-anvil technique. On the concave face of this sherd were coarse black and white particles which had been exposed by sandblasting.

Dr. Malcolm J. Rogers identified 3-4913 as Sells Plain ware (burnished) and 3-4914 as Sells Plain ware (western peripheral type).

Site 3. Surface sherds were relatively numerous at Site 3; all those seen were collected. One metate; fragments of three lava mullers resembling those illustrated by Haury;[10] and an elongate basalt cobble, perhaps used partly as muller and certainly as a pestle, judging from its battered ends, were observed. The metate was an irregular slab of black vesicular lava, 26 inches in maximum length and 14 inches in maximum width; near the middle was an oval depression in which grinding had been done, perhaps with one face of the cobble basalt muller-pestle found nearby. This muller-pestle was 14 inches long, 4½ inches in greatest width, and about 2 inches thick. It was obviously a natural cobble modified by use.

Species of shells observed on Site 3—on the northeast side of the Sonoita *estero*—have already been listed. An operculum of *Turbo fluctuosus* was found. It was not perforated as an artifact, as is one from Snaketown.[11]

Two *Glycimeris maculata* valves collected had been worked by man. One had a rough hole punched or cut out at the umbo. A much larger, oval area had been removed from the umbo and adjacent part of the second, apparently in preparing a shell artifact.

Chipped stone artifacts were not found, save for a flake of close-grained, dark gray stone (probably basalt, according to Pabst) which had been struck from a smooth cobble and showed a definite bulb of percussion. The chipping on the edge was probably the result of use rather than of retouching. A few fragments of obsidian were found, but none was an artifact.

Among the sherds recovered were a number with painted design. These were of two types, Trincheras Purple-on-red and Sacaton Red-on-buff. My identifications were kindly checked by Dr. Emil W. Haury, who wrote me under date of February 9, 1945.

Three sherds (3-4936), probably parts of the same vessel, were Trincheras Purple-on-red ware. The design, now largely sandblasted away, seems to have been chiefly of close parallel lines, perhaps crosshatched. Other sherds (3-4944), without design but with similar coarse sand temper and similarly striated inner surfaces, apparently belonged to the same type. This find and that at Site 1, Punta La Cholla, definitely extend the distribution of this ware to the coast considerably north of the mouth of the Magdalena River, to which Brand assumed it probably extended.[12] His distribution map shows definite boundaries for its eastern and northern limits but only tentative limits for its distribution in the unexplored western desert coastal region. None of the sherds attributed to Trincheras Purple-on-red ware showed evidence of paddle-and-anvil technique of manufacture. The striated inner surface mentioned above is referred to by Sauer and Brand in their statement that "the inside shows lines of scraping."[13] Hawley describes the same feature as "inside scraped."[14]

A larger batch of painted sherds (3-4938), revealing three patterns but possibly all from one vessel, are Sedentary Hohokam of the Sacaton Red-on-buff type. They are from a large vessel (or vessels) of the characteristic jar type with low shoulder and recurved rim rising directly from the walls without a neck. Fortunately, rim and shoulder sherds are among the fragments. The former correspond to *j*, the latter to *l* in Haury's Figure 66.[15] Many of the sherds have definite depressions

[10] Gladwin, Haury, Sayles, and Gladwin, 1937, Plate XLVI *e, g*.

[11] *Ibid.*, Plate CXIII *k*.

[12] Brand, 1935, Figure 1.

[13] Sauer and Brand, 1931, p. 109.

[14] Hawley, 1936, p. 59.

[15] Gladwin, Haury, Sayles, and Gladwin, 1937, Figure 66*j, l*.

on the concave side which may be interpreted as evidence of paddle-and-anvil technique in the manufacture of the vessels, further proof of their Hohokam origin.

Two additional shoulder sherds (3-4941) look like Sacaton Red-on-buff ware in texture, lack painted decoration, and are not like the shoulder sherd mentioned above (3-4938). They are more angular than Haury's type *l* shoulder (3-4938) and more nearly match the shoulder of his type *m* jar in the same figure.[16]

A number of sherds (3-4942) without painted decoration and with coarse sand temper but homogeneous paste were recovered. Most of these have depressions on the concave surface, indicating paddle-and-anvil technique. Despite their coarse temper, they are not friable like Trincheras Purple-on-red ware, but are hard and durable. The inner surface of these sherds is usually gray or black, the outer surface brown. A neck and rim sherd (3-4940) of this hard ware varies in thickness from 6 mm. in the body of the vessel to 8 mm. in the rim. It seemed to me to belong to the jar form pictured by Haury[17] as typical of Gila Plain ware, Estrella Phase of Pioneer Hohokam. Upon examination, however, Haury pronounced this sherd as "on the Sells Phase horizon of Papagueria." He added, "It was very inconsiderate of these late prehistoric people to duplicate the jar form used much earlier in the Gila Basin." Haury says that certain plain sherds (also numbered 3-4942) are "certainly Gila Plain."

Vahki Plain ware, Vahki Phase of Pioneer Hohokam Period, is represented by a large sherd (3-4937) apparently from a jar similar to Haury's Figure 104*c*.[18] The sherd varies in thickness from 3 to 5 mm., the greater thickness being in the neck portion. The specimen fits in all respects Haury's excellent description[19] of Vahki Plain ware. In checking my identification, Haury commented: "The sherd identification as Vahki Plain is certainly that and is early, whatever the exact date may be."

A number of sherds without painted decoration defy identification by Haury, Rogers, and myself. Among these are two (3-4939) which I had identified as Sacaton Red ware from Haury's description.[20] Upon examining these Haury wrote me, "Specimens 3-4939, identified as Sacaton Red, do not quite fit the characteristics of this ware, although from the interior color I can see why this assignment was made. Sacaton Red has a much brighter color and a much heavier slip and perhaps even a somewhat finer temper ingredient. The interior surfaces on these two sherds may be slipped but they strike me somewhat more as having retained superficially the fine particles of clay brought out as the result of the paddling. I may be wrong but I believe this certainly to be the case with the larger of the two specimens. Unfortunately, I cannot give you any specific ideas as to what the type is. It looks rather strange to me." Malcolm J. Rogers was also of the opinion that they lacked slip. He writes that they might be Papago Plain ware, an identification which he questions, however. Certain other sherds he also regarded as possibly Papago Plain ware: "I think that the sherds which I have marked as questionable might be considered Papago through a process of elimination. They are certainly not Yuman and their temper does not check with any Sells types in my collection, which is quite representative."

No sherds which resembled the wares of the modern Cocopa or Yuma of the Colorado River, the modern Papago, or the Seri were obtained at Site 3. None of the material was like the sherds in a small collection made at Guaymas in 1941. The affiliations of the material from Site 3 are with the Hohokam culture to the north and with the Trincheras culture to the east.

CHRONOLOGICAL CONSIDERATIONS

Since all sherds are from the surface, the occurrence of Trincheras and Hohokam types together at Site 3 does not constitute a chronologically significant cross find. Especially is this true since the Hohokam types cover a span of more than six hundred years; i.e., from the Sells Phase of A.D. 1200 or 1400 back to the Vahki Phase of A.D. 600.

The latest identified sherds from Site 3 are those of Sells Plain ware, which Haury, in his letter of February 9, 1945, dates from about A.D. 1200 or 1400. Next older is perhaps the Gila Plain ware, since it "had a very long life, having been in vogue during several periods and numerous phases."[21]

Next in order, and perhaps contemporaries

[16] *Ibid.*, Figure 66*m*.
[17] *Ibid.*, Figures 102, 108.
[18] *Ibid.*, p. 211.
[19] *Ibid.*, p. 211.
[20] *Ibid.*, pp. 202–204.
[21] *Ibid.*, p. 205.

at Site 3, would be Sacaton Red-on-buff and Trincheras Purple-on-red wares, which presumably date from about A.D. 900. Fulton and Tuthill found Trincheras sherds (whether Purple-on-red or Polychrome is not stated) at the Gleeson site at the southern end of the Dragoon Mountains, southeastern Arizona, associated with Santa Cruz and early Sacaton Hohokam sherds, which they date from A.D. 800 to 1000.[22] Haury, who writes (February 21, 1945) that their "Dragoon Complex is chronologically equivalent to the Sedentary Period" of the Hohokam, expresses this view elsewhere.[23]

Lastly, the Vahki Plain ware from Site 3 is the most ancient, dating from A.D. 600, according to Gladwin's revised estimate.[24]

Thus, the potsherds on the surface of Site 3, at the mouth of the Sonoita, reveal a rather extensive time perspective. Such a range would be unlikely on the surface of a deep, stratified site but is possible on this desert coast where man was not a permanent resident, but merely an occasional visitor through the centuries.

To the northwest, Punta La Cholla yielded few sherds, but these were of respectable antiquity; Dr. Malcolm J. Rogers identified the plain ware as dating from his Yuman I and II horizons, for which he offers dates of about 900-1050 and 1050-1400, respectively. The Trinchersa sherds found there are presumably of the same period as those found at Site 3. It is interesting that no Yuman sherds were found southeast of Punta La Cholla. All sherds obtained at the Sonoita *estero*, about twenty miles to the southeast, are of other than Yuman origin. Perhaps between these two points lies an ancient ethnic boundary between Yuman and Hohokam.

[22] Fulton and Tuthill, 1940, pp. 47–49.
[23] Haury, 1945, pp. 69–70.
[24] Gladwin, 1942, p. 4.

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WHEELED TOYS IN MEXICO

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IT IS the purpose of this paper to bring together all of the known examples of those archaeological objects from Mexico which it seems best to refer to as wheeled toys. All but one of these have previously been described and illustrated, but I have thought it worthwhile to repeat to a certain extent in order to put all the evidence into readily available form. I shall also discuss briefly certain of the historical and general anthropological implications of the presence of wheeled toys in ancient America.

In my opinion, the evidence to be presented indicates that the Indians of Mexico had some knowledge of the principle of the wheel in pre-Conquest times. This will come as a surprise to many, because the supposed absence of any knowledge of this principle in the New World has often been stressed in discussions concerning the origin of the American Indian and his cultures. It is held that the absence of the wheel is proof that contact with the developed cultures of the Old World could not have occurred and that the higher aspects of the New World cultures must have been autochthonous developments. This argument is not necessarily nullified by the finding of wheeled toys in Mexico, but because of them it certainly cannot be used without some reservation. More important, perhaps, and interesting from a number of points of view are the implications in regard to the general problems of inventions or of theories of culture growth which the presence of wheeled toys in America involves.

A wheeled toy found at the Pavón site in the town of Panuco, Vera Cruz, was described in my report on the excavation of that site.[1] Two side views of this specimen, with and without the wheels in position, are shown in Plate XXVI *a, b;* these, and a front view as well, were also published in the site report. The object was found at a point only several meters distant from my own stratigraphic excavation at the site shortly after I had left Mexico in June, 1942. It was found by Roberto Pavón, who had assisted me in my excavations and who reported the details of the find to me and supplied me with illustrations. He reported that the body of the figurine was found in a broken condition but that the wheels were in position as they are shown in the photograph. Since it was not preserved, it may be assumed that the axle was probably of wood or of some other perishable material. Of interest, however, are the spots of asphalt near the central holes of the wheels, indicating the probable method of attachment to the axles. I have stated elsewhere my considerable confidence in Mr. Pavón's ability to find and observe in position an object of this kind.

There can be little doubt that this wheeled toy is of pre-Conquest origin. It was, in fact, found at such a depth in the deposits of the site and in a cache with such other objects as to suggest a placement in the Period V horizon in the sequence of cultures I have tentatively outlined for the Tampico-Panuco area. Furthermore, in my investigations in the area, I found twenty-two examples of separate wheels identical to those belonging to the complete toy. Many of these were found in unquestionably undisturbed deposits in the stratigraphic trench at the Pavón site and at the site of Las Flores in the suburbs of Tampico. At this latter site we also found a pierced vessel lug identical with those on the complete toy, although it probably belonged to a somewhat larger figure.[2] The indications are, therefore, that objects of this kind are far from rare in the Tampico-Panuco area and that other good examples will be found in future excavations. The distribution of the wheels at the two sites seems to indicate that objects of this kind were made from Period III to Period V of the tentative sequence established for the Tampico-Panuco area, or, in terms of central Mexico, from the early half of the Teotihuacán Period up through the Tula or Aztec I-Mazapan horizons.

Another animal figure from the same area which is obviously the body portion of a wheeled toy is illustrated with other ceramic pieces by Staub.[3] Mere mention of this example must suffice, for Staub's illustration is too small to be reproduced here. The piece supposedly came from a railroad cut at Herradura, just south of Panuco. Apparently representing

[1] Ekholm, 1944, p. 472

[2] Ekholm, 1944, Fig. 48*y*.

[3] Staub, 1921, Fig. 5.

a peccary or an armadillo, it has a relatively thick and obviously hollow body decorated with three deeply incised bands crossing over the body from side to side. The lugs in the position of legs are perforated in the same manner as those of the specimen from the Pavón site, but Staub unfortunately makes no mention of finding associated wheels.

Of the several known examples of wheeled toys, those found at Tres Zapotes and published by Drucker are the most finely made.[4] They have been described in detail, so there is no need to do more than emphasize their probable identification as wheeled vehicles. This identification was not explicitly made by Drucker, but in the light of the specimen from Panuco and the others to be mentioned here there can be little doubt that it is the correct one. Plate XXVI *d* illustrates one of these specimens as it was recently shown in the Museo Nacional of Mexico with the wheels mounted on wooden axles. The same photograph, reproduced here through the courtesy of Sr. Eduardo Noguera, has also been published by José L. Cossio in *Cuadernos Americanos*.[5] This specimen was found in a single cache with two others nearly complete and one in a fragmentary condition.

Drucker may have been wise in no more than hinting at the possibility that these objects represent wheeled toys, but the problem must be faced. Of interest in this regard is the fact that in the same cache, although apparently not in the position of wheels, were twelve perforated disks, the correct number of wheels for the three more or less complete body portions. Drucker describes these wheels as follows: "The 12 perforated clay disks, as mentioned elsewhere, are not reworked sherds, but specially manufactured objects with the perforation made while the clay was soft. Four are made of fine buff paste (these also have crosses of blue paint on one side), 7 are of a slightly gritty orange paste, and one is of quite coarse light-brown material."[6] It is to be expected that if the twelve disks were made as wheels for the vehicles, the clay would be alike in groups of four, but it appears significant to me, nevertheless, that at least four of the wheels are of uniform paste and decoration. Furthermore, the situation here is precisely like that in the Tampico-Panuco area of the Huasteca in that these objects are specially made disks, unlike the perforated sherd disks common in all parts of the site and also unlike the spindle whorls of the latest Tres Zapotes horizon.

It will be noted, of course, that the Tres Zapotes toys are typologically distinct from the one from Panuco and the others to be described in having tubular axle housings. Drucker points out that the interiors of the tubes show no signs of wear, but this, it seems to me, does not necessarily argue against the objects having been manufactured as wheeled vehicles. Pottery and objects of various kinds found in caches or graves often show no signs of use.

The next wheeled toy to be considered is one of a number dug up by Charnay in 1880 at a site known as Tenenepango, located on the slopes of the volcano Popocatepetl, just southeast of Mexico City.[7] Charnay's illustration of one of these objects, described as a wheeled chariot, is copied in Plate XXVI *c*. Thus a good example of a wheeled toy has been in the literature for many years, but it has seldom been seriously considered, probably because of the rather extravagant and somewhat untrustworthy writing to which Charnay was given. Charnay's illustration has also been copied by Holmes.[8] There is no reason, however, for not accepting this object as contemporary with the other ceramic material Charnay reported from the site and as a perfectly acceptable example of a wheeled toy. As far as can be determined, all of the wheeled toys found by Charnay were either taken to Europe or have been lost,[9] but much of the other material from the site is in the Museo Nacional of Mexico. In Vaillant's certainly correct judgment, all of this material belongs to the Aztec I-Mazapan or Tula-Toltec horizon, Tenenepango being apparently a one-period site.[10]

We must depend entirely on Charnay's illustration, but it appears to be an accurate reproduction. He gives two views, one without and the other with the wheels in position, which make it clear that the perforated lugs in the positions of the legs of an animal are like those in the example from Panuco. The body of the

[4] Drucker, 1943, p. 112; Plate 49*a–c, f*.
[5] Cossio, 1944, opposite p. 204. [6] Drucker, 1943, p. 114.
[7] Charnay, 1888, pp. 170, 174. [8] Holmes, 1919, p. 21.
[9] At my request, Sr. Noguera has most kindly made a search in the Museo Nacional, but he could not locate any of Charnay's wheeled toys.
[10] Vaillant, 1938, p. 545.

animal appears to be solid, not hollow as in all the others, but the general form of the body is similar to that of both the Panuco specimen and of the Oaxaca toy to be considered below. A statement by Charnay indicates that the wheels on his toys, like those at Tres Zapotes and in the Huasteca, were quite different from the common spindle whorls of Central Mexico.

The last wheeled toy to be discussed is a curious one I recently discovered in the collections of The American Museum of Natural History (catalog number 30.0–3274). It was obtained by Marshall H. Saville on one of his expeditions to Oaxaca between the years 1898 and 1902. Its provenience is not given in the Museum catalog, but Saville had labeled it as from the "Valley of Oaxaca" on a plate he had prepared for publication just before his death. I would suppose that it was probably purchased by Saville, as there is nothing to indicate that he found it in any of his own excavations in that vicinity. It is a rather simplified animal figure $7\frac{3}{4}$ inches in overall length. The body consists of a round hollow tube which has four short lugs in the positions of the legs. The head, also hollow, has some object inside which makes it a rattle. The lugs are pierced transversely so that the holes enter the hollow of the body proper. These holes, approximately $\frac{7}{16}$ inch in diameter, were quite clearly made before firing. The really extraordinary feature is the rider, unfortunately incomplete, seated on the animal's back with legs clasping the sides of the animal in a manner exactly like that of a horseback rider. There are also clay fillets behind and in front of the rider which obviously represent some form of saddle. The sides and top of the body of the animal are covered with a well polished black slip, brownish where it has been rubbed thin. On the belly portion and the chest is an unpolished, rather thick white slip which is preserved only in spots. The head is unpolished and appears also to have been covered with the white slip, of which there are some slight remnants. A band of thin red paint crosses the saddle and the hips of the rider.

In one way, this is the best example we have of a wheeled toy, because the upper edges of the transverse holes which contained the axles are definitely worn smooth, showing use. This is something which has not been noted in any of the other specimens but which should be observable if the toys were actually pulled along as miniature vehicles.

The presence of a rider, seated in what is quite obviously a saddle, is certainly outside of native tradition and tends to force us to the conclusion that this toy must have been made in Spanish times in an attempt to show a horse and rider. Even so, however, it was probably in the tradition of the earlier wheeled toys of Mexico rather than in a similar Spanish tradition, if such existed. I do not know the nature of the toys of sixteenth-century Spain, but it seems to me that a European of that time making a model of a horse and rider would be less likely to put wheels on the horse than would an Indian who was acquainted with wheeled toys in the form of animals. On the other hand, the character of the clay and slip and other details of its manufacture indicate this toy is entirely a product of native workmanship. I am not intimately familiar with Oaxacan ceramics and hence cannot speak with conviction as to its place within the ceramic patterns of that area, but comparison with the fairly large collection in the American Museum of Natural History shows it to be definitely in the "Zapotec" tradition. The slip is blacker than that on most examples of the gray ware of the Monte Alban sequence, but it is not outside the range of color of that ware. It will also be observed that the body of the animal is a straight tube, as in the example from the Huasteca, and, except that it is hollow, it is like Charnay's toy from Popocatepetl. The construction which makes the head of the animal a rattle is also a native trait of long standing.

It is likely that wheeled toys of the kind described here were more common and more widely distributed than is indicated by the few whole specimens so far recovered. Specially made perforated disks of the kind found in the Huasteca occur in various collections from Middle America but have usually been classified as spindle whorls. I have not attempted to trace their distribution, but I find, for example, that a number of disks which I feel quite certain were used as wheels were found by Vaillant in his excavations at San Francisco Mazapan and at El Corral, both in the Valley of Mexico.

The perforated clay disks identified here as wheels appear to be typologically distinct from spindle whorls. This is true at least in the Huasteca, where what have been described as wheels are uniformly crudely made, often with the perforation well off center. Those objects which are certainly identifiable as

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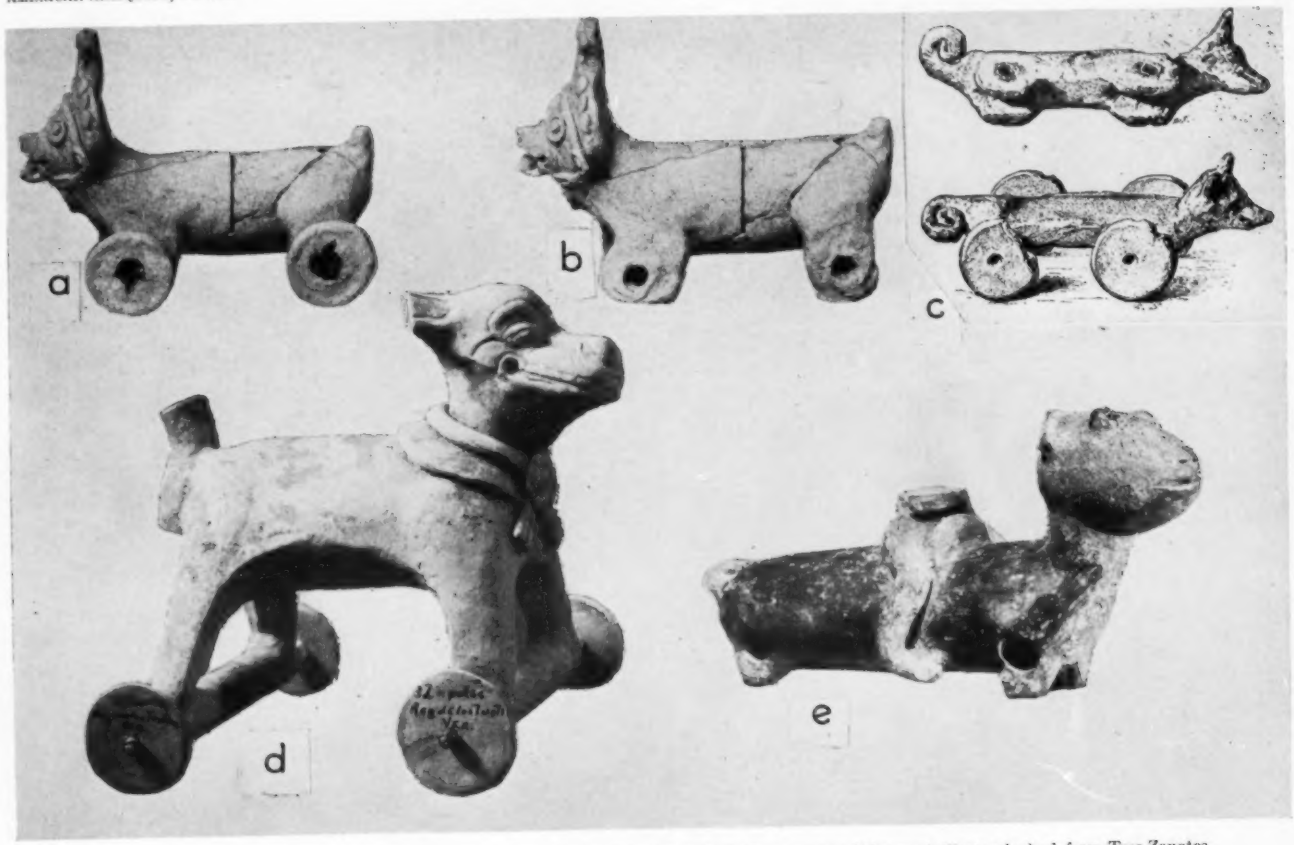

Wheeled toys from Mexico. *a*, *b*, from Panuco, Vera Cruz, length 7 inches; *c*, from Tenenepango (Charnay's illustration); *d*, from Tres Zapotes, Vera Cruz; *e*, from Valley of Oaxaca.

spindle whorls are, on the other hand, always very carefully made with the perforation precisely centered. Actually, those wheels in which the holes are badly off center could hardly have been used as spindle whorls, a fact which almost certainly indicates that the type cannot be so identified at all. Even if they are not from toy vehicles, they still cannot be classed as spindle whorls.

We must also mention those perforated disks ground down from pottery fragments which are found abundantly in Middle America and elsewhere and which have been identified by some as spindle whorls. Such an identification appears doubtful in many cases, however, as the perforations may again be considerably off center. There is nothing to suggest that they could have been used as wheels either, and their function remains unknown.

The available examples of wheeled toys indicate a fairly extensive distribution of the trait both in space and in time. They are found in the Valley of Mexico and in central and northern Vera Cruz and Oaxaca, assuming that the one from Oaxaca, if made in post-Conquest time, is a survival of an earlier form in that area. Charnay's example from Tenenepango belongs certainly to the Mazapan-Toltec horizon, as does—with somewhat less certainty, perhaps—the complete specimen from Panuco. The Tres Zapotes figures can, however, be ascribed to an earlier horizon, definitely within that of the Teotihuacán Period of the Valley of Mexico. Some of the individual wheels from Panuco also are from a horizon previous to the Mazapan-Toltec. Furthermore, if we are correct in ascribing the "horse with rider" specimen from Oaxaca to the contact period, the trait persisted up to that time. It would seem fairly certain, then, that the few examples so far discovered cover a period of at least several hundred years, and possibly a much longer period of time.

The significance of the broad areal and temporal distribution of this curious trait is, of course, that it was more than just a thing that occurred once, perhaps by chance, and then was dropped. The idea of wheeled toys was definitely established in the cultures of Middle America. It was passed from one group to another and from one generation to another for a considerable period of time.

The evidence reviewed so far seems to me to indicate fairly conclusively that miniature wheeled vehicles were made, and there was therefore some knowledge of the principle of the wheel, in pre-Conquest Mexico. We must remember, however, that the evidence is somewhat scanty and largely circumstantial and that it would be well to have more of these toys with the wheels in place found in situ by trained archaeologists before it is accepted unreservedly. What evidence we do have, however, is sufficiently convincing to be accepted tentatively and to warrant examining some of the implications of that acceptance. Some attempt must be made to explain this new fact or to fit it into our total knowledge of American Indian cultures.

In the first place, it seems quite clear and certain that wheeled vehicles were not actually used as a means of transport anywhere in the New World up to the time of the first European contact. It might be profitable to examine all of the early literature with this problem in mind, but, in view of its unusual and generally recognized significance, it would seem that any reference to wheeled vehicles would have been picked out and discussed long ago. Charnay listed several references to literary sources which he though might indicate the use of the wheel in pre-Conquest Mexico, but there is nothing conclusive in them, as far as I can discover.[11]

It is within the realm of possibility that the toy vehicles of Mexico are the result of contact with or influence from some Old World culture, but speculation as to how or when this may have occurred is outside the limits of this paper. Although remote, this possibility cannot be entirely disregarded, because there are still many highly controversial problems in regard to New World and Old World contacts that remain unsolved.

If we agree that our miniature vehicles were not copied from actual vehicles used in transport and that they were not the result of contact with the cultures of the Old World, both of which possibilities seem to me quite unlikely, we are confronted with an interesting problem. We have toys or miniatures involving an important mechanical principle not put to practical use in the culture. Such a situation appears to be extremely uncommon in the so-called primitive cultures of the world, for I can find no case comparable to it. This is an aspect of culture which appears not to have been studied in detail by anyone, and, al-

[11] Charnay, 1888, p. 174.

though I know I am entering upon uncertain ground, I want at least to indicate the existence of problems in this regard. When we consider the various kinds of miniatures or toys found in the primitive cultures of the world, we see a nearly universal use of dolls, which are miniatures of people or animals, and of miniatures of various manufactured objects common to every-day life such as pottery vessels, grinding stones, or weapons. Of rather common occurrence also are toys involving mechanical principles which have no particular practical application in the general framework of primitive culture, such as tops, kites, or the buzz disk. Seemingly uncommon, however, are toys or models—for instance, toy bows and arrows—involving principles which could have been put to use in cultures where they are not so used or in cultures not in contact with peoples who did use them. When its full implications are considered, the presence of wheeled toys in the New World must be recognized as completely unexpected.

Why, then, do we find wheeled toys in Mexico? We obviously cannot answer this question with any degree of certainty at the present time and must await further studies or new information which may lead to an explanation. In the meantime, however, I will hazard the opinion that our wheeled toys are best explained as a pure discovery or invention—the visualization of a mechanical device and the making of a model. Before discussing this point further, we might mention several factors which may have been involved in the discovery and in its lack of adaptation to practical uses.

The several kinds of revolving objects widespread among the American cultures might have contributed to the discovery of the principle of the wheel. These include the spindle, the pump drill and bow drill, the top, the buzz disk, and—possibly—the roller. Of these, the spindle appears to me to be the most likely candidate, since our vehicles are only toys and the use of clay spindle whorls was common in Mexico, at least in the later periods. A spindle with a clay whorl is actually an axle with a wheel on it, and it is not difficult to imagine that a person playing with one, perhaps placing a second whorl on the spindle, might be able to visualize its use as an element of a vehicle.

The idea of the wheeled vehicle might also have arisen from a practice of using wooden rollers for moving heavy stones, this being the explanation commonly suggested for the invention of the wheel in the Old World. An objection to this, however, is that we have no good evidence that rollers were used for moving heavy stones or for any other purpose in the New World, and I don't believe we can assume that they were used. Given enough manpower, the largest stones used by the American Indian could probably have been dragged along on the bare ground or on a skidway of poles. Furthermore, it seems more likely that the evolution from roller to wheel would produce a full-sized and practical vehicle, not small toys. In passing, it might be well to mention that the only archaeological evidence suggesting the use of the roller in the Americas is a stone cylinder found by Alfonso Villa on one of the great roadways of northern Yucatan.[12] Villa suggests that this object may have been used for pressing down and leveling the road surface, but this identification is far from certain. It could just as well have been a portion of an architectural column, and, in any event, a roller used as a leveling device is not the same thing as a roller used to move heavy objects.

But whether we consider wheeled toys in America to have originated through influences from the Old World or to have been the result of the outright invention of a mechanical principle, there remains the further problem of why this principle was never put to actual use as a means of transport. This is, however, a problem somewhat easier of explanation than that of the origin of the idea. The wheeled toy appears to me to be a prime example of an invention or idea the practical value of which was not realized, or, if it were realized, was not useful because of the nature of the existing culture. There were probably many factors responsible for the failure to apply the principle of the wheel to practical uses, even if its value were appreciated, and it is impossible for us to analyze them fully or correctly. We might mention a few of the most obvious factors, all of which may have been operative. In Mexico there were no domesticated animals which could have been used for draft purposes, and the lack of such animals would probably be a prime deterrent to an application of the wheel to transport. The generally rugged nature of the Mexican terrain and the thick forests of the

[12] Villa, 1934, p. 199.

coastal lowlands would also stand in the way of use of the wheel for transport and the construction of suitable roads. It would not, however, prevent certain local adaptations of the wheel for such activities as hauling water from the local source of supply over hardened and in some cases perfectly level terrain. It is perfectly clear, too, that roads could and would have been built if really desired, as witness the remarkable roads of northern Yucatan, one of which extends for a distance of 100 kilometers between the ruins of Cobá and Yaxuna. Except for certain transverse steps and unnecessary rises at what appear to have been temple stations, these roads were constructed almost like modern highways; they were up to thirty feet or more in width, were elevated, and had smoothed masonry surfaces.[13]

An even more significant factor than either of these more obvious ones may have been a tendency toward conservatism in the American Indian cultures, especially in the field of material culture. Even if certain persons in Mexico did fully appreciate the potential value of the wheel, it is possible the idea would not have taken hold and been developed. The traditional and simple method of transport, that of packing everything on the human back, was a deeply ingrained habit, in some ways quite adequate. Interesting in this regard is the persistence to the present day of back-packing among many of the Indian groups of Mexico. Great packs of produce are carried along modern automobile highways on the backs of Indians who have not even arrived at the stage of using beasts of burden—a pattern to which they have been exposed for four hundred years and one which is well suited to a mountainous country.

The most interesting problem concerning our wheeled toys from Mexico is, of course, that of their origin. As I suggested before, it seems most likely that they were a pure invention—the visualization of a mechanical principle and the making of a model. This is an almost necessary conclusion if we assume that full-sized vehicles were never used in the Americas and that there was no contact with wheel-using cultures of the Old World. Certainly the Mexican toys could not have been the result of an evolutionary process beginning with the use of a roller, for that could only have produced a usable vehicle of larger size. By far the simpler and better explanation is that a spindle with its whorl gave someone the idea of the wheel as it is used on a vehicle, and that he simply made a workable model of clay in the form of an animal. Having toy vehicles, the people of Mexico were, of course, far from having a true wheeled vehicle. That would have required further inventions and a certain amount of evolutionary development, but the wheeled toys attest to their at least knowing the basic principle from which such a development could have occurred.

If this proves to be the true explanation of the wheeled toys from Mexico, a similar explanation of the invention of the wheel in the Old World becomes more plausible. Such an origin for the wheel in the Near East was in fact suggested by Eduard Hahn,[14] whose views on the subject have been summarized by Lowie, as follows: " . . . he assumes that the cart originated as 'a model by which the votaries of the Babylonian astral faith imitated on earth the movements of their celestial deities.' This miniature conveyance, sprung from the brain of 'an idle priest,' was constructed of a spindle with whorls. In enlarged guise it was later taken beyond the temple precincts, and streets were built on 'which the gods might roll along in chariots. Very gradually, like many other things, the divine carriage was degraded to a utensil of daily life'."[15]

Such an hypothesis might eventually be borne out when more becomes known of Late Neolithic materials in the Near East, for miniature vehicles of clay would be well preserved where full-sized vehicles of wood may have left no trace. Whether or not evidence of this kind is ever found, however, a completely isolated and at least partial occurrence of the process in the New World lends weight to the possibility that Hahn was not too far from the truth.

It must be mentioned in this regard that miniature clay vehicles in the form of animals have been found in Mesopotamia[16] and that they are remarkably similar to those from Mexico. They are approximately the same size, have crudely made wheels which might be mistaken for spindle whorls, and have hollow bodies. These toys are not, however, significant

[13] Thompson, Pollock, and Charlot, 1932.

[14] Hahn, 1909, p. 40.

[15] Lowie, 1937, pp. 118–119.

[16] Breasted, 1933, Fig. 181; Woolley, 1930, Fig. 11.

in regard to the origin of the wheel, for they date from the middle of the third millennium B.C., at least a thousand years after the wheel appears in Sumerian art.[17] Neither do they have any particular bearing on the problem of the wheeled toys of Mexico, but their marked resemblance to them is highly interesting and worthy of note.

[17] Childe, 1936, p. 140.

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THE ARCHAEOLOGICAL SITUATION AT SPIRO, OKLAHOMA; A PRELIMINARY REPORT

KENNETH GORDON ORR

INTRODUCTION

SINCE its discovery and exploitation by commercial diggers in 1933, the unusually rich ceremonial complex of the Spiro Mounds, Leflore County, Oklahoma, has engaged the interest of archaeologists.[1] The importance of the Spiro site to Southeastern archaeology has been recognized, and the science has awaited a report of the scientific excavation undertaken by the Work Projects Administration and the University of Oklahoma for a number of years.[2]

[1] Material from commercial excavations at Spiro is in the following museums: Museum of the American Indian, Museum of the University of Arkansas, Kansas City Museum, and the Nebraska State Historical Society. An unusually large private collection is that of Mr. H. M. Trowbridge, Bethel, Kansas. The scientifically excavated Spiro material is in the Museum of the University of Oklahoma, the University of Tulsa, the Oklahoma Historical Society, and the Frank Phillips Woolaroc Museum.

[2] The scientific excavations took place during the period 1936–1941 as an activity of the WPA Statewide Archaeological Project, sponsored by the University of Oklahoma and the University of Tulsa, Dr. Forrest E. Clements, director. Archaeological supervisors associated with the excavation and laboratory reconstructions included: Fred Carder, J. J. Finklestein, Carl Ball, Lynn Howard, Phil J. Newkumet, David Baerreis, Rodney Cobb, and Sarah White (Mrs. Clements). The writer was in charge of excavations at Spiro during the period January, 1938–March, 1939, and subsequently served as research archaeologist in the laboratory analysis of the Spiro material. Excavated sites of Spiro area shown in Fig. 30 (1936–40). Pb. 1, a small unit east of Cr. 1 excavated in 1941, is not covered in this report.

No comprehensive report on this important area has been published to date.[3]

The large and complex scientific collection from the Spiro area is in an incomplete state of research at the present time, but certain results have been achieved. The writer has felt that these results, though incomplete and often tentative, should be made available to archaeologists in a preliminary report of progress without further delay. The main purpose of this paper is to present the archaeological situation in the Spiro area by means of sketch descriptions of the respective cultural units, and by indicating the interrelationships of these units. The position of Spiro area units in reference to other cultural units in the "Caddoan" archaeological area[4] has been worked out and the results are briefly surveyed here. Whereas the results may not be considered final—many additions and minor modifications will be made —they may be regarded as working hypotheses and a groundwork on which intensified research of the future can be based.

The apparent exotic nature and "Middle American flavor" of the Spiro ceremonial complex interested archaeologists from its first appearance. Waring and Holder, utilizing artifacts from the commercial excavations, demonstrated that this material forms a part of the Southern or "Buzzard" Cult. Their excellent study indicates that fully 83 per cent of the fifty-one traits associated with the Cult are found at Spiro; other large ceremonial centers include Etowah, Georgia, and Moundville, Alabama.[5] Due to the abundance of Cult material at Spiro, the site may provide many answers to problems concerning the nature and derivation of the Cult. No attempt is made here to examine the Cult material in detail, though certain facts emerge from the work, and hypotheses are advanced.

The method of presentation employed in this report leaves much to be desired in the way of detail. The confines of the paper and incomplete state of research allow only the basic data to be presented. The pottery types have been developed for the specific purpose of aiding comparisons between units of the Spiro area. As a result, certain types are perhaps overinclusive for other purposes. Such types are subject to further breakdown in order to demonstrate intra-site relations as research proceeds.

Only the materials scientifically excavated from the Spiro area are utilized in this paper. With the exceptions noted in the text,[6] all units of the Spiro area reported on were excavated by the writer. Mr. Henry Hamilton, of Marshall, Missouri, has made a noteworthy contribution to the archaeology of the area in collecting photographs and data on a large part of the material secured from the commercial excavations which is now in private collections or museums throughout the Middle West and East,[7] It is hoped that this valuable document may soon appear in published form along with a complete presentation of the Spiro site.

The writer is very appreciative of the generous financial aid provided by the Faculty Research Committee of the University of Oklahoma for purposes of illustrating this article. Grateful acknowledgement is extended to Dr. J. Willis Stovall, director of the Museum of the University of Oklahoma and in charge of the Spiro area collection, for his gracious cooperation and invaluable aid in preparing this paper; and to Mr. Ralph B. Shead, research artist of the Museum, for his kindness in providing line drawings for illustrations.

DESCRIPTIVE SKETCH OF CULTURAL UNITS OF THE SPIRO AREA

The Spiro Site

Location.—The Spiro site extends approximately one mile from north to south and one-half mile from east to west, occupying a highland ridge flanking a bend of the Arkansas River in northern Leflore County, Oklahoma (Fig. 31). At an elevation of from thirty to

[3] One field report has been published; Orr, 1939.

[4] The "Caddoan" archaeological area is defined in Swanton, 1932, Fig. 7. The writer realizes the inadvisability of using the linguistic term "Caddoan" in referring to nondocumented archaeological sites. However, the term has gained such widespread acceptance that its use is almost indispensable in any preliminary study. Except where sites known to have been occupied by Caddoan-speaking peoples are referred to, quotation marks will be used to indicate the sense in which the term is applied in this paper.

[5] Waring and Holder, 1945. Waring points out the preferable use of the term "Southern Cult" first introduced by Ford and Willey in 1941. Waring, 1945, p. 58.

[6] The Craig mound and several smaller units of the Spiro site were excavated in 1936–1937. Data on the Craig mound compiled by Carder, Finklestein, Ball and Howard and organized by Newkumet are referred to in the interpretations. Otherwise, the writer's field and laboratory notes provide the source material for this paper.

[7] Hamilton, N. D.

sixty feet above the present channel, the site gave no evidence of having undergone floods subsequent to occupation. However, considerable sheetwater erosion had taken place and many houses had been removed from the more exposed knolls. The mounds had been eroded only to a limited degree. Broken artifacts and flint chips litter the site, and periodic plowing continually unearths cultural material. The bulk of the site, excepting the northern area where the Choates component was found, represented the three Spiro components.

Units of the Site.—Eight mounds of varying sizes and a village site comprise the main units of the site. They do not appear to form a significant pattern. The dimensions, forms, and uses of the mounds are given in Table 1.

excavation (1936–1939) the Craig, Brown, and Ward mounds were completely excavated, with the exception of a section ten feet wide in the center of the Brown mound (Br. 3). The other mounds were partially excavated or merely tested. Unfortunately, the midden (Br. 4, Test 6), potentially most valuable for cultural diagnosis, could not be excavated due to leasing difficulties. The greater part of the village section was thoroughly tested with the results indicated above.

Ordinarily such extensive mound excavation as accomplished at Spiro would have yielded a wealth of stratigraphic data. The earlier commercial excavation, however, had been so thorough as to seriously handicap an interpretation of the stratigraphy. Each mound was

TABLE 1.—MOUND UNITS OF THE SPIRO SITE

Mound Designation*	Dimensions	Form	Uses
Cr. 1 (Craig mound)	300 feet north-south 115 feet east-west 33 feet high	Large conical and 3 smaller hemispherical mounds	Burial mound; "temple" inside; crematory; platform(?)
Br. 3-Cr. 3 (Brown mound)	200 feet north-south 175 feet east-west 15 feet high	Truncated pyramidal	Platform for structure; burials
Br. 2 (Brown 2 mound)	60 feet diameter 8 feet high	Hemispherical	Platform for structure(?)
Wa. 2-1 (Ward 2-1)	80 feet diameter 2½ feet high	Hemispherical	Burial mound
Wa. 2-2 (Ward 2-2)	80 feet diameter 2½ feet high	Hemispherical	Burial mound
Br. 1 (Brown 1)	30 feet diameter 5 feet high	Hemispherical	Mound over house
Br. 4, Test 5 (Brown 4)	30 feet diameter 2½ feet high	Hemispherical	Mound over house
Br. 4, Test 6 (Brown 4)	40 feet diameter 2 feet high	Hemispherical	Midden

* "Lf.," omitted here, precedes all symbols and indicates Leflore County; second abbreviation refers to owner; number refers to unit of excavation.

Forty-five house sites, containing fired clay, wattle, charcoal, artifacts, and post molds, were discovered a few inches to a foot under the surface. Of these, thirteen yielded satisfactory post patterns; the remainder either were unexcavated or gave inconclusive data. One unusually large house site (Cr. 5) undoubtedly functioned as a ceremonial structure, the others probably served as dwelling houses (Pl. XXX, *e*). On the basis of varying cultural content, time differences between various sections of the village may be postulated. The western section (Ev. 1, Ev. 2, Br. 4) is considered earliest, the middle section (Ev. 3, Wa. 3) of an intermediate period, and the northern section (Ct. 2) latest.

Excavation.—In the course of the scientific gutted, in some cases by the use of horse and scraper and dynamite. Long term research using careful checks will be necessary before the structural details of the Craig mound can be clearly realized, though the relative position of the burial features is known. The Brown mound, less seriously damaged, yielded fairly comprehensive information on the stages of construction.

Cultural Material.—The quantity and elaborateness of Spiro artifacts are almost legendary.[8] Even after the commerclal diggers had dispersed artifacts to numerous collectors and

[8] The Spiro finds are described as "one of the most amazing caches of ceremonial material ever found in the mound area." Waring and Holder, 1945, footnote 1.

several museums, a sufficient quantity remained to give a comprehensive picture of the culture. In the Craig mound (Pl. XXVII, *a*), richest of the mounds, copious burial gifts were excavated with the badly decomposed remains of over five hundred individuals interred in one hundred eighty-nine burials. Approximately one hundred more individuals with burial gifts were found in five burials in the Brown mound and ten in the Ward mound. An estimate of over a thousand individuals is probably not in excess of the original number buried in the Spiro mounds. Fully two hundred eighteen complete or restorable vessels came from the Craig mound. In thirty-nine burial features representing the Middle Spiro component, eighteen pipes, eighty-nine earspools, eight celts, over one thousand sixty-eight projectile points, several bushels of shell beads and conch shells, and eighty-one restorable vessels were found. The village yielded thousands of sherds and a limited number of types of artifacts; which material represented a utilitarian complex contrasting sharply with the more elaborate ceremonial artifacts.

Method of Analysis.—The analysis of the site was approached from both the typological and stratigraphical standpoints. The superposition of burial features, particularly in the conical mound section of the Craig mound, made it possible to recognize earlier and later burials. Types of artifacts from the earliest burials contrasted with those from the latest burials, and to a lesser extent with types from burials of the intermediate position (Fig. 32). On the basis of differences in cultural content, three components representing three time periods were postulated. A comparison of types of artifacts from the three components, especially ceramic types, with those of related archaeological areas, where cultural sequences had been worked out, served to confirm the tripartite division. By this method an Early Spiro, Middle Spiro, and Late Spiro component were defined.

Cultural Interpretations.—The Early and Late components may be interpreted as initial and terminal periods in a cultural continuum. In defining these periods, we are enabled to trace Spiro culture backward to its probable roots and project it forward to its final form. Cultural change was continually taking place, at differing paces depending on the trait under consideration. The three components are most clearly differentiated by the presence or absence of Southern Cult paraphernalia,[9] the Middle component having it in abundance, and the other components either lacking it (Late component) or having only small amounts of Cult materials (Early component). The evidence strongly suggests that Spiro was occupied prior to the full expression of the Cult and abandoned after the Cult had undergone a marked decrease in intensity.

Research completed to date allows a fairly precise placement of Spiro in relation to other archaeological units in the Southeast. Particularly striking is the close similarity of Early component pottery to Coles Creek pottery,[10] and the near identity of Late component pottery with that defined by Harrington as "Caddoan."[11] The Spiro sequence gives strong support to Ford's sequence from Coles Creek through Caddoan, developed in Louisiana. However, as pointed out below, several "Caddoan" periods are defined in the Spiro area, a fact to which cognizance must be given in any comprehensive interpretation of cultural developments in the lower Mississippi area.

The Early Spiro Component

Burial Complex.—Ten pottery vessels from the Craig mound show a close similarity to French Fork and Coles Creek incised types (Fig. 32). In addition, six vessels from lowest level burials (Spiro 3 type) resemble Coles Creek plain types and probably belong with this horizon. An examination of the features and artifacts of early burials reveals a complex different from and more simplified than the majority of Craig mound burials. The elaborate material of the cult burials was lacking in the majority of early burials, though a few con-

[9] Waring and Holder define fifty-one elements of Cult paraphernalia 83 per cent of which occur at Spiro. The elements include—motifs: cross, sun circle, bi-lobed arrow, forked eye, open eye, barred oval, hand and eye, death motifs; god-animal representations: eagle, woodpecker, turkey, rattlesnake, human, anthropomorphized animal beings; ceremonial objects: gorgets, columella pendants, embossed copper plates, copper symbol badges, sheet copper hair emblems, earspools, hafted celts, pierced celts, ceremonial celts, monolithic axes, baton, effigy pipes, discoidal stones, conch shell bowls, ceremonial flints, bottles; costume elements: details of dress including fringed apron, beaded forelock, belt, choker, and bands on arms and legs. Waring and Holder, 1945, pp. 3–19.

[10] Ford, 1936; Haag (editor), 1939; Lemley and Dickinson, 1936.

[11] Harrington, 1920.

tained plain conch shells and one, a ground stone (quartz) effigy boatstone. Cremation appeared to be the dominant type of burial. A few primary and secondary burials were also found. The burial features consisted of the remains of only a few individuals. One bowl contained charred skeletal material. A large baked clay basin, measuring 19 feet in diameter and 2½ feet in thickness and containing charred human bone and teeth, was found at the base of the Craig mound. It undoubtedly was used as a crematory during the earliest period of occupation.

Village Complex.—Both plain and incised sherds of the Coles Creek type occurred in small percentages in the village features. While all village features contained the basic utilitarian pottery (Spiro 1 type comprising 85 per cent of the sherds recovered), certain features had greater proportions of Coles Creek ceramic types. It was possible to distinguish different time periods on the basis of the following method of analysis: (1) square bases are earlier, since they typify Coles Creek and in addition are lacking in the Late component; (2) the greater the percentage of square bases in a given feature, the greater is the likelihood that the feature represented the Early component; (3) whereas in the central village section only 2 per cent of the bases are square and 98 per cent are of the disk type, in the western section fully 30 per cent of the bases are square and 70 per cent, disk; (4) it therefore appears probable that the western section is earlier than the central section of the village. The earlier village section was then examined for artifact types with which to build up the Early component complex.

Unfortunately, the early village section did not yield satisfactory post patterns. A small, square house with four center posts, in the north village section (Ct. 2, House 2) contained potentially early artifact types—further research is needed here—and represented the earliest house type of the Spiro area according to typology (Fig. 36 *a*, Pl. XXX *a*). It is tentatively assigned to the Early component.

One house was found underneath the Brown mound (Br. 3, House 1). Previous commercial excavations had removed all but the west wall. Sufficient remained to indicate a square or rectangular house with rounded corners and baked clay floor. The artifact content included pottery of Spiro 1 type, with a preponderance of bone tempering (considered an early trait) and suggested affiliation with the Early component. Of considerable importance was the occurrence of thin, shell-tempered ware in the form of a single small jar with outflaring rim (Spiro D type), five perforated mussel shells (hoes?), and a large stemmed point with ogival blade. The significance of this atypical material presents a problem. It may represent trade goods.

Summary.—Further research must be undertaken to clear up the above-mentioned problems and to define further the early occupation. At present we may only state that some phase of the Coles Creek horizon, probably the latest period, is represented in the earliest Spiro period. The culture at this time did not appear to have been fully affected by the Cult phenomenon and, compared with the later penods, was a relatively simple economy.

EARLY SPIRO COMPONENT

Tentative Cultural Inventory

Symbols:
*occurs in burial only
**occurs in burial and village

Structural Complex

Mounds: Small truncated mounds with structure on top (Br. 3 primary mound)
Small burial mounds
Houses: Square, four center posts (average 25 feet square), trench entrance, baked clay floor.
Houses under small mounds

Burial Complex

Group burials: Containing three to thirteen individuals.
Burial type: Cremations (most); primary; secondary.
Extended and semi-flexed positions
Burial gifts: Special pottery, but not greatly differentiated from utilitarian wares
Cult paraphernalia largely lacking
Bark and cane matting under burials
Crematory basin

Ceramic Complex[12]

French Fork Incised:[13] (two vessels).* Temper: angular clay particles. Texture: compact, contorted, fine paste. Hardness: 4. Color: gray and buff. Thickness: .6 cm. Surface finish: smooth and dull polish. Form: (1) four-lobed globular bowl with short collar; (2) bowl with oblate spheroidal body, round base and slightly grooved lips. Decorations: triangular and circular punctates, curvilinear incised line elements; triangular punctates at end of curvilinear line in typical French Fork incised style but no hachured background; decoration on entire body in re-

[12] Method of manufacture of all ceramic types in the Spiro area is probably by means of the coiling technique. No evidence of the paddle and anvil technique has been found.

[13] Haag (editor), 1939, p. 9.

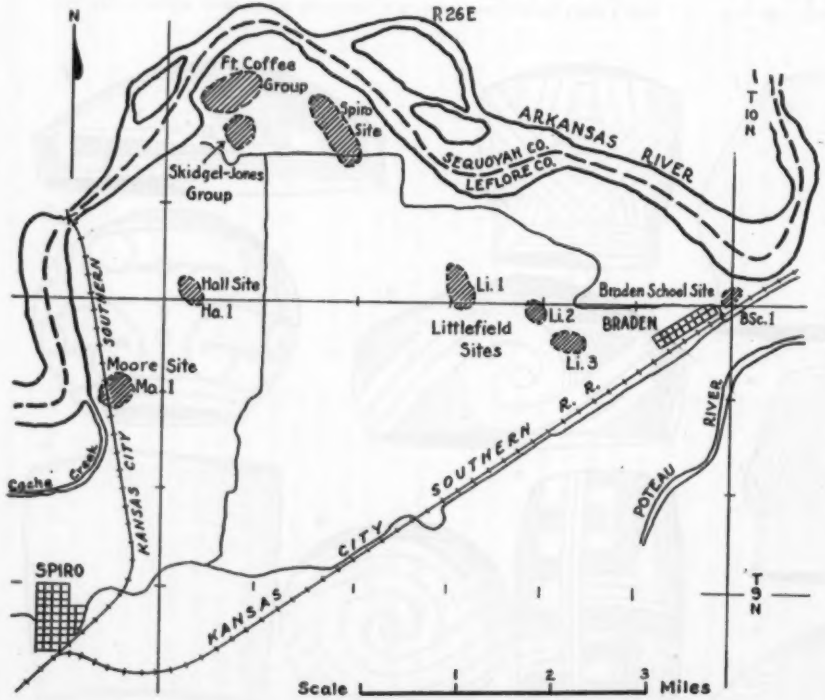


FIG. 30.—Map of the Spiro area, Leflore County, Oklahoma.

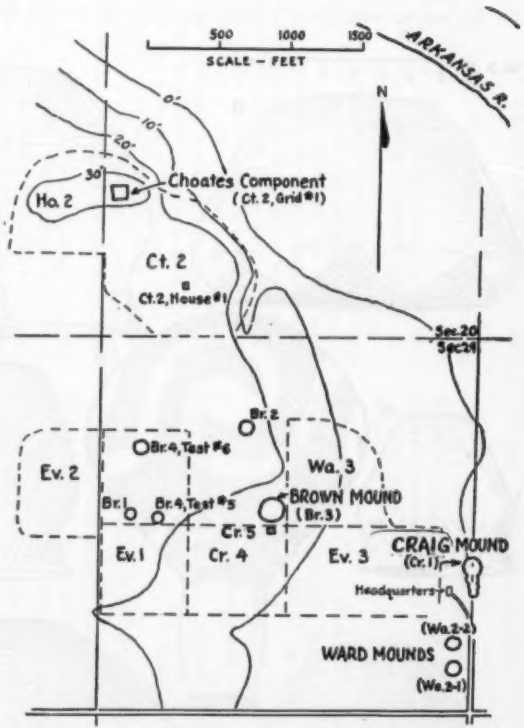


FIG. 31.—Map of the Spiro site, Leflore County, Oklahoma.

FIG. 32.—Ceramic types of the Spiro site. *a*, *d*, Early component, Coles Creek incised, French Fork incised; *b*, *e*, Middle component, Spiro 5 type; *g*, Spiro 7 type; *c*, *f*, Late component, Spiro 4 types. Vessels ⅛ plate scale.

FIG. 33.—Ceramic types of the Fort Coffee focus. *a*, *b*, *e*, *f*, Bowman site (Bo. 1); *c*, *d*, *g*. Moore site (Mo. 1). Fort Coffee 1 type, *a*, *b*, *c*, *e*, *f*, *g*. Fort Coffee 2 type, *d*. Vessels ⅛ plate scale.

curring motifs; incised lines parallel to rim in Coles Creek incised style

Coles Creek Incised:[14] (eight vessels,* a few village sherds). Temper: angular clay particles. Texture: compact, contorted, slightly lumpy. Hardness: 2.5–4, average 3. Color: light and dark gray, light brown. Thickness: average .6 cm. Surface finish: smooth and polished, marked by smoothing tool. Form: (1) cylindrical jar with square base; (2) double bowl, superimposed spheroidal bodies; (3) bowl with oblate spheroidal body, with or without short collar; (4) small hemispherical bowls, with and without folded rims, bases either round or square, lips often grooved and flattened to plane of orifice. Bowls resembling longitudinal half-sections of gourds, with grooved lips, may also be included here. Decoration: one to four horizontal lines parallel to rim top, some lines overhanging, lines both incised and engraved (most); rows of large triangular punctates located below horizontal lines; lips with one and two grooves. Decoration mainly restricted to rim area

Spiro 1 Type: (85 per cent of sherds in village). Temper: large angular particles of clay, bone, and grit (rare). Texture: lumpy, contorted, compact, many have a soft, chalky, surface texture. Hardness: 2.0–3.5, average 3.0. Thickness: .7–2.0 cm., average 1.2 cm. Color: buff and dun-orange. Surface finish: smoothed, smoothing-tool marks on majority. Forms: (1) large jars with vertical rims and globular bodies; (2) large hemispherical and globular bowls, lips rounded and flattened, some grooved, square and disk bases (most). Decoration: grooved lips consisting of one to four incised lines; bodies undecorated; coiled basket impressions on bases (rare)

Spiro 2 Type: (small percentage in village). Temper: small particles of clay, vegetal tempering (rare). Texture: lumpy, contorted, compact. Hardness: 2.0–3.0. Color: dark brown, some red-filmed. Thickness: .5–.8 cm. Surface finish: rough to smooth. Form: jars with vertical rims and globular bodies, hemispherical bowls

Spiro 3 Type: (six vessels*). Temper: fine clay particles, Texture: contorted, compact, fine paste. Hardness: 2.5–4.5, average 3.5. Color: brown. Thickness: .8–1.8 cm, 1.0 average. Surface finish: rough to smooth. Form: (1) jar with inverted pear-shaped body and outflaring rim, square base; (2) jar with cylindrical form in which oral diameter nearly equals disk base diameter, slightly globular body; (3) jar with contracting rim; (4) small hemispherical bowls; bases square or disk types in which disk is sharply differentiated from body. Decoration: coiled basket impressions on disk base

Spiro D Type: (one vessel at base of Brown mound). Temper: shell. Texture: coarse, flaky. Hardness: 2. Color: dark brown. Thickness: .4 cm. Surface finish: porous, brush marked. Form: jar with short rim outflaring at sharp angle, disk base, flat lip

Pottery effigy. Red clay turtle*

Chipped Stone

Blade: small, leaf-shaped; large triangular*
Hoe: elliptical, of limestone
Projectile points: small stemmed* large stemmed (associated with Spiro D type pottery)

Ground Stone

Mano: rectangular
Effigy boatstone: quartz in form of locust*
Metate
Pecking pebble: elliptical
Celt: short, elliptical
Beads: spheroidal, cylindrical, of black stone**

Shell

Mussel shell: perforated (hoe?) (associated with Spiro D pottery) and unworked**
Beads*

Miscellaneous

Quartz fragments
Seed beads*
Galena fragments
Caches of small pebbles (rattle?)*

The Middle Spiro Component

Units of the Middle Component.—It was determined that the following units of the Spiro site belong to the Middle component on the basis of uniform artifact content and the presence of Cult paraphernalia in abundance: middle strata burials and the central chamber of the Craig mound, burials and secondary mound of the Brown mound (Br. 3), the Ward mounds (Wa. 2-1, 2), houses of the central village section (Ev. 3), the ceremonial structure (Cr. 5), and the midden and house mounds of the Brown 4 area (Br. 4, Test 5, 6). A cultural inventory, partially representing the component, was derived by an examination of the traits in the above units.

Stratigraphy of the Craig mound is not entirely clear at the present stage of research. We may note that the conical mound, predominantly a burial container, was constructed during the middle period, probably as an addition to the three smaller mounds joining it to the south. Hamilton describes caches of Cult paraphernalia (Middle component types) in the "temple" room, which was apparently a circular structure cut into the center of the Craig mound.[15] The Brown mound consisted of a primary truncated mound which served as a structure platform for the Early component, and a secondary mound built in a series of stages, one of which was capped by a band of red clay 2 feet thick. Burials intrusive into the Brown mound represent the late phase of the Middle component, consequently the mound was completed during the Middle period. Since Late component burials are intrusive into the final form of the Craig mound, it is clear that the process of building the mound was com-

[14] *Ibid.*, p. 11. Ford 1936, Figs. 34, 35, 39.

[15] Hamilton, N. D.

pleted by the end of the Middle period. The mounds Br. 1 and Br. 2 have not been assigned to a period, but may also be included in the Middle component. The small Ward mounds were the result of accretive growth.

Burial Complex.—It has been ascertained that thirty-four burial features of the Craig mound belong to the Middle component. The skeletal material, in burials containing from two to thirty-one individuals, represents more than two hundred twenty-one skeletons, all in an advanced state of decomposition. Due to the condition of the skeletal material, data as to orientation are extremely fragmentary. Five burials, including one large feature containing thirty individuals, were intrusive in the top of the Brown mound. Whereas the contents of these burials showed basic affiliation with Middle component material of the Craig mound, interesting variations indicating time differences within the middle period were noted. The two Ward mounds yielded ten individual and group burials with a limited amount of Middle component material. They were possibly used for lesser dignitaries and for the common people of the Spiro society. The large burial pits were lined with plaited cane matting; several contained cedar poles lashed together in the form of a square (Pl. XXVII *b*). Such "cribbing" might well have served as a stretcher on which the bodies were born to the burial pit.[16]

The burials contained a wealth of burial gifts, most of which were Cult paraphernalia. The majority had from six to ten different artifact types. The main types of artifacts found with the thirty-nine burials of the Middle component are as follows; the number of burials in which each occurred is indicated in parentheses: pottery (39); beads of pearl, shell, and stone (30); projectile points (27); earspools (22); conch shell bowls (21); green and red pigment (16); pipes (12); galena nodules (11); textiles of hair, feathers, and vegetable fibers (11); copper veneers and artifacts (11); matting (11); ceremonial flint blades (9). It is interesting to note that, whereas pottery was present in all burials, it actually comprised only a small percentage of the total number of individual artifacts—the greatest proportion of burial gifts consisted of artifacts of ground or chipped stone or shell.

Village Complex.—The village, in which six houses were excavated, was located mainly in the central section of the site. It was composed of rectangular structures with four center posts (Fig. 36 *b*, Pl. XXX *b*). The houses, which measured approximately 17×21 feet, had baked clay floors and trench entrances. It is, perhaps, significant that these structures did not have fireplaces. A suggestion of communal cooking is seen in the abundance of ash and animal bones found within ceremonial structures (Cr. 5 and the structure on the primary mound of Br. 3).

The complex of artifacts presented a sharp contrast in its relative simplicity to that found in the burials. This utilitarian complex consisted mainly of thick undecorated ware in the form of very large jars and bowls, large stemmed points, manos and metates, pecking pebbles, and large stone slab hoes. Fragments of Cult paraphernalia which were found, though very few, were sufficient to tie together the utilitarian complex of the village and the ceremonial complex of the mounds.

Trade Material.—In a culture as diverse in types as Spiro, it is often difficult to determine whether a given artifact is "at home" or represents trade material. The embryonic state of comparative research in the area further complicates the problem. Spiro people undoubtedly were in contact with other groups. An initial suggestion of outside contact was seen in the shell-tempered ware (Spiro D type) of the earliest level of the Brown mound. Ware, form or decoration of a few vessels of the Middle component appeared sufficiently different to set them apart. Such types are indicated by the use of letters (Spiro A, B, C, D types). One vessel of especial importance, a blank-faced effigy bottle (Spiro B type), has duplicates in the Tennessee-Cumberland aspect and is considered typical of the middle period of the Kincaid site in southern Illinois.[17] Three shell-tempered jars with strap handles and node decorations (Spiro C type) also appear foreign, and similarly, there are allied types at the Kincaid site. Further evidence of far-flung contacts with distant areas is seen in the marine shells from

[16] In describing the funeral ceremony of Spotted Serpent, Natchez Sun, in 1725, Du Pratz noted, "The Spotted Serpent having been carried out of his cabin in state was placed on a stretcher carried by four men; another bar was placed towards the center supported by two more men. These six men were guardians of the Temple." Du Pratz (1758) 1940, p. 56.

[17] Orr, N. D. *c.*

the Gulf coast, copper from the Great Lakes area, and a series of flint types from sources other than local.

Time Differences in the Middle Component.—It may not be assumed that the Middle component represented complete cultural homogeneity and stability. The abundance of the material suggests a relatively lengthy occupation during which changes in artifact types undoubtedly took place. The first suggestion of cultural change was seen in burials intrusive in the Brown mound. In them, the conch shells and pottery lacked engraved designs and no trace was found of the Cult ground stone complex, suggesting that the Cult may have been on the wane at this time. Certain burials of the Cult period show either markedly early or late period traits. Several, for example, have linear incised red ware (Spiro 6 type) and tabbed bowls as in Late component burials. Others show a preponderance of earlier traits such as black stone beads, exclusive use of green pigment (red associated with Late component burials), bark matting, and earlier ceramic types. An early and a later phase have been postulated for the Middle component, though much research is needed before a detailed picture of cultural change is achieved.

Summary.—The Middle component was the period of most extensive occupation and greatest cultural development—this is clearly seen in the quantity and excellent quality of the artifacts and the large number of mound and house features associated with the component. The concepts of the Southern Cult dominated the ceremonial complex but affected the utilitarian complex to a considerably lesser degree. Trade materials from distant areas suggest wide cultural contacts to the north, east, and south.

MIDDLE SPIRO COMPONENT

Partial Cultural Inventory
(Plates XXVIII, XXIX)

Symbols:
*occurs in village only
**occurs in village and burial

Structural Complex

Mounds: Truncated pyramidal mound (15×200 feet), burials intrusive in mound sides, clay facing on mound sides.
Burial mounds: large conical mound (33×115 feet); small hemispherical mounds (2½×80 feet); "temple" room in mound
Small mounds over burned house sites
Midden mound (2×40 feet)

Houses: Ceremonial structure (Cr. 5), rectangular, 40×32 feet, long axis north-south, four center posts, no wattle, baked clay floor, much ash and animal bone
Dwelling structures (six in Ev. 3), rectangular, 17×21 feet, four center posts, trench entrance, double posts at corners and wall sections, much grooved wattle, long axis east-west, no fireplace

Burial Complex

Group burials (most): Two to over thirty-one individuals, average five to ten
Burial type: Secondary bundle (most); primary; partial cremations (few)
Extended and semi-flexed positions (primary)
Orientation: cardinal direction or unknown
Burial Gifts: Quantity of Cult paraphernalia; many stone and shell artifacts; relatively few vessels
Cane matting lined burial pits
Cedar log cribbing (stretcher?) in square formation

Ceramic Complex

*Spiro 1 Type:** (90 per cent of middle component village ware). See Early component description. Middle component Spiro 1 type identical to that of Early component but is slightly thinner, lips lack grooves and square bases absent, bone tempering very rare

*Spiro 2 Type:** (few sherds). See Early component description

Spiro 5 Type: (fifty-seven vessels, numerous rim sherds). Temper: fine particles of clay, bone and clay (rare). Texture: very fine, compact, contorted. Hardness: 2.5–4, average 3. Color: brown (darker shades), black, red-orange (few). Thickness: .5–.8 cm., average .7 cm. Surface finish: smooth to polished. Forms: jars: (1) cylindrical, (2) with short, straight, and out-flaring rims, and inverted pear-shaped bodies, (3) "spittoon," small jar with tall rim and globular body (one case); bottles with tall conical necks and spherical bodies; bowls: (1) hemispherical bowls, (2) vertical rimmed bowls, rim varied in depth from one-fourth to three-fourths of vessel height, (3) hemispherical bowls with two opposite open spouts on rim, (4) globular bowls with two opposite tabs on rim; disk bases predominate, round bases rare; rounded and contracting lips. Decoration: mainly restricted to bowls and bottles; all engraved; designs in band arrangement encompassing body of vessel, motifs in from two to five panels (majority, four panels); motifs based on scroll or concentric circle predominate. Common motifs: (1) interlocking scrolls with circle nucleuses, nested arcs (most common), reed punctates, or nested angles fill triangular spaces between scroll and border; (2) three or four horizontal lines parallel to plane of rim on bowl rims and bottle shoulders; (3) evolving spirals in panels; (4) concentric circles and squares (rare) in panels; (5) "simplified" version of (1) above in which concentric circles replace scroll element and resultant triangle elements are retained; (6) curvilinear designs based on circle and scroll, background areas filled with small triangular punctates

Spiro 6 Type: (fourteen vessels) Temper: fine particles of clay. Hardness: 3 to 4. Texture: fine, compact, contorted. Surface finish: polished, red-filmed (all). Color: red (darker

shades). Form: (vessels larger than corresponding Spiro 5 types) bowls: (1) with short vertical rim and conical body, (2) conical bowl, (3) bowls with oval horizontal crosssection, some with frog head effigy(?) at rim (eight vessels in one burial); bottle: very large bottle with cylindrical neck and oblate spheroid body; bases all disk except oval bowls which are round; rounded lips. Decoration: engraved linear lines, none are curvilinear: (1) opposing series of close-spaced parallel lines arranged diagonally on outer rim (vertical rim bowl), (2) nine rows of close-spaced nail impressions in band on shoulder (bottle). Decoration occasionally on inner rim. (Late phase of Middle component) *Spiro 7 Type:*** (three vessels, several fragments from burials, few sherds from village). Temper: grit, small particles of clay. Texture: fine, compact, contorted. Hardness: 3. Color: brown (few), red-orange (most). Surface finish: rough to smooth. Forms: jars: (1) beaker with conical body and short outflaring rim, rounded base, (2) jar with deeply outcurved rim, unknown body, grooved lip. Decoration: type is characterized by angular designs in panels with dot punctate stippling used as background and to fill apices of angles. Motifs: (1) engraved linear arches with stippling at apices, two panels in band around body, parallel horizontal lines at rim top (beaker), (2) alternate circular and square elements in panels, background stippling (curved rim jar).

Spiro A Type: (three vessels). Temper: small clay particles. Texture: fine, contorted, compact. Hardness: 3. Color: brown. Thickness: .6 cm. Surface finish: smooth and polished. Form: bowls: (1) cylindrical bowls with short collar and two opposite vertical, triangular tabs, semicircular extension of collar under tabs, (2) hemispherical bowl with same tab and collar arrangement as cylindrical bowl. Decoration: (1) engraved close-spaced diagonal lines on collar (cylindrical bowl), (2) engraved horizontal lines on collar (hemispherical bowl)

Spiro B Type: (one vessel). Temper: shell. Texture: fine, flaky. Hardness: 2.5. Color: brown. Thickness: .6 cm. Surface finish: porous. Form: blank faced, owl effigy bottle, head on conic neck, spheroidal body, disk base. (Late phase of Middle component)

Spiro C Type: (three vessels). Temper: shell. Hardness: 2 minus. Texture: fine, flaky. Color: brown. Thickness: .7 cm. Surface finish: rough to smooth. Forms: jars: (1) with short acutely angled (outward) rim on spheroidal body, two opposite strap handles on rim, flattened lip, disk base, tripod base (1 case). Decoration: (1) hemispherical nodes on shoulder of jar within "V" motif of raised appliqué ridges (four panels), (2) nodes in irregular rows on shoulder, (3) three nodes on top of handles and on body of handles, two notched appliqué ridges extending outward from base of handle

Pottery pipes: elbow (rare); long stemmed with small conical bowl (late phase)

Chipped Stone

(Many colors and types of flint)

Projectile points:
- Small stemmed points with barbs and expanding bases (most)
  - Base types: semicircular notch at bottom of base; rounded or straight stem base; fishtail base
  - Blade types: elongated; campanulated; double set of barbs; serrated edges usually excluding tip portion
- Large stemmed points with shoulder (sometimes barbed) and contracting base; with expanding base and barbs*

Blades:
- Long fusi-elliptical blade with or without notches near one end; leaf-shaped small blade; small flakes chipped by use along edge*

Ground Stone

Kind of stone: hard grey limestone (most); green serpentine, bauxite, granite
Pipes: T-shaped with single and double bowl;** elbow;** effigy, ceremonial figures in kneeling positions, bowl in back, human (most) and animal
Earspools: bi-cymbal type, with and without (most) copper veneer, incised (most) with concentric circle, nested angles, cross motifs**
Celts: long elliptical (most);** rectanguloid;* spatulate celt with long handle and plain or notched spade-shaped head
Mano: rectanguloid and ovoid*
Metate*
Monolithic axe
Hammerstone: spheroid of quartzite*
Hoe: large pear-shaped slab with ground blade**
Buttons: disks with outer shell circle
Pecking pebble: small elliptical (common)*
Discoidal stone
Baton: polished flint
Boatstone (rare)
Net sinker: perforated triangular stone (rare)*
Beads: spheroid and hemispheroid of black stone**
Cannel coal: small disks** (rare); elliptical blade

Shell

Conch shell: half-shell bowls, engraved with realistic and geometric designs, or plain;** gorgets with engraved designs and holes for suspension
Beads: disk; hourglass; spherical, elliptical; cylindrical; olivella shells; pearls. Engraved (rare) and plain
Pendant
Shell inlays in stone and wood: disks, "teeth," "eyes," "earspools"

Copper

Plates: embossed designs including eagle being, bird heads, and cross
Bodkins (long needle-like artifacts)
Copper veneer on wood and stone artifacts

Wood

Wood preserved by copper veneer
Earspools: carved design
Buttons
Effigies: eagle head; human figurines; human face masks; bird on stick

Bone (very rare)

Awl: deer ulna bone
Polished bone fragments
Beads: disk

Miscellaneous

Seed beads
Galena nodules

Pigment: green (glauconite or chromium oxide); red ochre; white (kaolin); black; yellow-gray; limonite blocks*
Mica fragments
Matting: plaited cane; bark
Textiles: hair and vegetable fiber cloth; feather cloth
Leather: worked fragments
Quartz crystals: worked and unworked fragments
Pebbles: caches of small pebbles (rattles)
Pyrites (rare)
Geodes: small, highly polished*

The Late Spiro Component

Units of the Late Component.—Units of the Late component share in common a body of types of artifacts and features distinct from, though related to, types of the Middle component; similarly, Cult paraphernalia are absent from such units. At the Spiro site, the Late component is represented by burials in the top layers of the conical Craig mound and by several house sites in the north section of the village (Ct. 2). The Skidgel site,[18] located one mile to the west and consisting of a large conical mound (Sk. 2) and five houses in the village section (Jo. 1), undoubtedly belongs with the Late component, though further analysis is necessary.

Ceremonial Complex.—Since the Late component is represented by burials intrusive into the final stage of the Craig mound and is not found in other mound units, it is clear that at the Spiro site the mound building process had largely ceased prior to the latest period. Its truncated top suggests that the Brown mound may have been in use as a platform for a structure, but commercial diggers had destroyed most of the evidence. The custom of building mounds continued, however, at the Skidgel site, where a large conical mound, measuring 20 feet in height and 125 feet in diameter, was completely excavated. The mound contained only a few areas of charcoal and a slab rock platform of unknown use located in the central area. Although the number of artifacts was not sufficient for the purpose, the three house features (rectangular, two center post types) found directly under the mound served to affiliate it with the Late component.

The seven Craig mound burials identified with the component consisted mainly of primary interments containing a few individuals in extended and flexed positions oriented according to the cardinal directions. Late component pottery, projectile points, and shell beads comprised the main burial gifts. Cult paraphernalia, so plentiful in burials of the earlier period, were not found.

Village Complex.—The rectangular, two center post house was the dominant type in units of the Late component at the Spiro and Skidgel sites (Fig. 36 *c*, *d;* Pl. XXX *c*). Baked clay floors, orientation of the long axis in the east-west line, central fireplace, and post entrances characterized all houses. The village at the Skidgel site (Jo. 1) contained two rectangular houses which, in addition to the above-mentioned traits, had a single row of secondary posts extending across the central east-west axis. Typologically, the houses represent a fusion of Middle component traits (baked clay floor, orientation according to the cardinal directions, rectangular form) and late Fort Coffee focus traits (two center posts, post entrance, central fireplace), and could be regarded as a transitional form of architecture.

Artifact Complex.—The latest burials in the Craig mound yielded twenty-three vessels which were typologically the latest found in the Spiro mounds. The pottery (Spiro 4 type) is similar or identical to types of vessels unearthed by Harrington at the Washington and Ozan sites in southwestern Arkansas[19] and classified as "Caddoan." Other burial pottery, particularly hemispherical bowls with four opposite lip tabs, resembles main types of the Fort Coffee focus. In most cases prototypes for traits of the Late component could be found in the Middle component complex.

A similar fusion of artifact traits was seen in the Spiro village units associated with the Late component. Sherd-tempered ware (similar to but thinner than Spiro 1 type) was found intermingled with thin, shell-tempered ware in Late component houses. Small projectile points (Middle component types), triangular points, and small ensiform "drills" (Fort Coffee types) were also found.

The pottery from the Skidgel village (Jo. 1) was mainly tempered with clay particles, though shell and vegetable tempering were also found. The main types of ware could be included with Spiro 1 and 2 types; many sherds had smooth red-slipped surfaces. A yellow-slipped ware with brush marks was also found. Small hemispherical bowls and jars having out-

[18] The Skidgel site was tested and partially excavated by the writer in 1938, and completed by Phil J. Newkumet.

[19] Harrington, 1920.

flaring rims, with rim tabs, predominated. Of especial importance was a thin polished black and brown ware with engraved curvilinear designs in which small triangle or large dot punctates fill design areas. This ware is identical with Spiro 5 types represening the latest phase of the Middle component. Galena balls, ground stone celts, small stemmed points, and elliptical stone hoes served to link the village more closely with the Spiro components. Since burials were not found, we may assume that the Skidgel people buried their dead in the Craig mound.

Summary.—The Late component represented the last period of occupation of the Spiro mounds at a time when the Cult was disappearing rapidly. The custom of building mounds, continued at the Skidgel site in modified form, was on the decline and soon to disappear in the Fort Coffee period. Types of artifacts as well as features appear as forms intermediate between those of the Middle component and the ensuing Fort Coffee types. The component may be regarded as a phase transitional between the two cultural units, though more intensive comparative studies are required to establish this relationship.

THE LATE SPIRO COMPONENT

Tentative Cultural Inventory

Symbols:
*occurs in burials only
**occurs in burials and village

Structural Complex

Mounds: Craig mound used for burials; conical mound (125×20 feet) containing unknown slab rock feature (Skidgel site), mound over house sites.

Houses: Rectangular, two center post houses (average 20×28 feet), with or without central axis secondary posts, long axis oriented east-west, baked clay floor, clay pedestal threshold (Ct. 2), post entrance, central fireplace

Ceramic Complex

Spiro 4 Type: (seven complete vessels)** Washington and Ozan type.[39] Temper: fine particles of clay, grit, some shell. Texture: fine, compact. Hardness: 2–3. Color: brown (mainly darker shades) and red-orange. Thickness: .5–.9 cm., average .6 cm. Surface finish: smooth to polished, red filmed. Forms: bottles: (1) with globular bodies and gradually sloping shoulder, conico-cylinder neck, (2) cylinder bottle with short neck, (3) elongated neckless bottle with two opposite lugs near lip, (4) composite bottle resembling upper half of bottle on flaring rim jar; bowls: (1) hemispherical bowl with short vertical rim, (2) cazuela bowl; bases mainly disk, rounded (cazuela bowl); rounded lips. Decoration: entire body of vessel covered by engraved designs; three to four panels in band. Motifs: based on interlocking waves, cross-hatched strips, scroll. Elements: small negative circles surrounded by hachuring, short line spurs, diagonal gash punctates on outer rim top, multilinear elements

*Spiro 6 Type:*** (few vessels and sherds). See Middle component description. Red slipped ware as in Middle component with additional forms: (1) composite bowl resembling vertical rimmed bowl superimposed on hemispherical bowl, scalloped lip, (2) conical bowl with scalloped lip

Spiro 9 Type: (sixteen vessels and some sherds).** Temper: shell. Texture: contorted, flaky. Hardness: 2–3.5, average 2.5. Color: brown, gray, some red-orange, a few with red film. Thickness: .5–.8 cm., majority .8 cm. Surface finish: porous and rough to smooth. Forms: jars: (1) very large jars with short outflaring rim and inverted pear-shaped body, (2) slightly outflaring rim on globular body, four opposite strap handles on rim; bowls: (1) bowls with short vertical rims, (2) hemispherical bowls with and without scalloped rims, (3) hemispherical bowl with four opposite elongated tabs on lip, (4) conical bowls; bottle with cylindrical neck on globular body. Decoration: lip tabs on bowls, rows of hemispherical nodes on body of jars and bottles

Other Artifacts

Chipped stone.
  Projectile points: small stemmed points with or without serrated edges**; small triangular points; point covered with red pigment*
  Drill: small ensiform
Ground stone.
  Discoidal stone.* Manos: rectanguloid with finger pits. Celts: elliptical. Metates. Hoe: elliptical with ground stone blade
Shell: disk beads.*
Pigment: red ochre*
Cannel coal fragments
Clay: bead
Galena: ball

The Fort Coffee Focus

Survey of the Focus

Seven sites in the Spiro area, excavated in 1938 and 1939, have been segregated and assigned to the Fort Coffee focus (Fig. 30), named for the area on the western bluff of the Fort Coffee bend in which it was first recognized. The site units are:

The Fort Coffee component (Bo. 1, Bm. 1, Sk. 1 Grid #1)—3 burial grounds and a village.

The Moore site (Mo. 1)—a large burial ground and village

The Littlefield site (Li. 1)—small burial ground and village

[39] Comparable types illustrated in Harrington, 1920, Pls. LXXXIX *b*, LXXVIII, LXXXII *a*, LXXXIII *a*, LXXII *a*, XXXVIII *b* (Washington site); Pls. LXXIX *b*, LI *a*, XXIV *b* (Ozan 1 site); Pl. XCII *b* (Hot Springs 3 site); Pl. XLIII *b* (Ozan 5 site).

The Littlefield 2 site (Li. 2)—village
The Littlefield 3 site (Li. 3)—village
The Bowman 2 and Pratt 1 site (Bo. 2–Pr. 1)—village
The Choates 2 and Holt 2 site (Ct. 2, Grid #1–Ho. 2)—village

The sites shared a large number of traits in common. Each had the rectangular, two center post type of house with central fireplace, post entrances, and a few secondary wall posts (Fig. 36 *f*, Pl. XXX *d*). Individual semiflexed burials were most frequent, although the flat burial grounds also contained extended interments. Among burial gifts, pottery vessels were preponderant (Pl. XXVII *c*, *d*). The most common type of pottery, representing approximately 80 per cent of all ceramics in most sites, consisted of thin, porous, shell-tempered ware of either dark brown or red-orange color (Fort Coffee 1 type). Vessels were small in comparison with those of the Spiro village. They were decorated with relatively simplified, engraved, curvilinear and linear designs, and nail punctates. Negative elements (circles, "Z" elements) surrounded by diagonal-line hachuring were especially characteristic. Lip nodes and tabs were common. Nonceramic artifacts typifying the focus included: small triangular points, elbow pipes of limestone or pottery, diamond-shaped blades with reverse bevel edges, and rectangular manos with finger pits. It is important to note that the typical Cult paraphernalia, such as conch shells, earspools, effigy pipes, spatulate celts, and elaborate spiral designs on pottery, were lacking.

A comparison of the ceramic complex with that of Louisiana sites showed a marked similarity to Caddoan pottery, as defined by Ford and Walker.[21] Despite extensive excavation, however, no trace of white trade material was found. Although we must consider the focus "prehistoric" from this standpoint, it undoubtedly was coeval with historic cultures in the lower Mississippi valley.

Some differences, particularly in ceramics, were noted between components of the focus and they should be regarded as having probable chronological significance. In order to indicate these differences, present a sketch of the units comprising the focus, and remain within the confines of this paper, only the three most prolific sites are briefly presented here.

[21] Ford, 1936; Walker, 1935

The Fort Coffee Component

Three sites, located within a radius of one-fourth mile (S½ of Sec. 19, T 10 N, R 26 E) on highland ridges adjacent to Fort Coffee,[22] showed sufficient homogeneity to be regarded as a single component. Within these sites were found three burial groups, each having slight differences in artifact content—differences which may reflect the passage of time but which could represent plausible variations within the same period.

The Gertrude Bowman Site (*Bo. 1*).—Ten houses, a few hemispherical cache pits, and a burial ground were located within a village area approximately 1,500×700 feet in extent. The burial ground—an area measuring 65×80 feet was excavated—yielded forty vessels, one pipe, two flint knives, five projectile points, and one celt. It had previously been looted by commerical diggers who hauled away a "wagon load of pots." Due to poor drainage, only traces of skeletal material remained. Nine of the houses were the rectangular, two center post type; one was a square, four center post type of the Early Spiro component. No artifacts were found in the square house, and the juxtaposition of a rectangular house indicated that both could not have been occupied at the same time. A few sherds resembling Spiro 5 ware of the Spiro middle component came from the surface of the site, and with the square house probably represented an earlier occupation by people of the Middle Spiro component. A quantity of sherds, 413, mainly Fort Coffee 1 type, and few ground and chipped stone artifacts came from the house sites.

The Granville Bowman Site (*Bm. 1*).—This site, located in the immediate area of Fort Coffee, consisted of a burial area, of which a portion measuring 100×60 feet was tested, and two superimposed rectangular houses containing two small, hemispherical refuse pits. Nine burials yielded nineteen vessels, three points, one knife, and one celt, but only fragments of skeletal material. Locations of ten more burials were discovered, but leasing difficulties prevented excavation. The orientation of one skeleton could be determined as semiflexed with head to the north. Vessels were clustered

[22] At the time the military Fort Coffee was established to receive Choctaw immigrants in 1834 there was no trace of the aboriginal sites and "the grounds were covered with tall trees and cedars." Morrison, 1936, p. 59.

around the head of each individual. The superimposed houses measured 26×20 feet and 20×16 feet, and were identical with those found at Bo. 1.

The Skidgel Burial Ground (Sk. 1, Grid #1).—This site consisted of a badly eroded burial ground situated one-fourth mile southwest of the Bo. 1 site. Only a few teeth remained, but a quantity of specimens was found: twenty-six vessels, one clay elbow pipe, one tubular limestone elbow pipe, four thin lanceolate flint knives, three diamond-shaped knives with reverse beveled edges, fourteen triangular and one large stemmed point with contracting stem, ten ensiform flint "drills," one lump of chalk.

Distinctive Traits of the Fort Coffee Component.—A few sherds belonging to the Choates component (Choates 1 type, see below) came from Bo. 1 and Bm. 1 houses and indicated contact with the Choates culture. In addition, many jars had vertical ridges on the rim in the Choates 1 style. Other distinctive characteristics include: hemispherical bowls with four opposite tabs on the lip, very wide bowls with slightly outflaring rims (Fig. 33). The designs, unlike those of the other Fort Coffee units, were carelessly executed, and the tracing on many resembled lead lines which might have been engraved with a galena or charcoal stylus.

The Moore Component (Mo. 1)

In 1885 a line crew of the Kansas City and Southern Railroad struck into approximately one hundred burials in laying tracks across the land of Mr. H. M. Moore, one mile northeast of the town of Spiro (N½ of Sec. 12, and S½ of Sec. 1, T 9 N, R 25E). The scientific excavation in the spring of 1938 uncovered a total of fifty-six individually interred skeletons. In addition, two rectangular houses and five hemispherical refuse pits were excavated directly south of the burial ground. Surface remains, such as flint chips, etc., indicated an extensive village site situated on the second river terrace one-half mile east of the Arkansas River.

The flat burial ground yielded over fifty vessels and a lesser quantity of stone and bone artifacts. Fortunately, and due to excellent drainage because of the sandy subsoil, the skeletal material was very well preserved and gives us a fairly complete picture of Fort Coffee burial customs and physical types. The dominant position of burial was semiflexed, with the skeleton resting on the back; a few burials occurred in the extended position. The cranial type was predominantly mesocephalic and lacked deformation. Female skeletons had bone awls, manos, and a scapula hoe as burial gifts, while male skeletons were accompanied by clay elbow pipes, projectile points, and flint blades. Interesting evidence for a division of labor between the sexes is seen here.

Distinctive Traits of the Moore Component.—Due to good drainage, resulting in a minimum of leaching of calcium, the shell-tempered ware was considerably less porous than that from the Fort Coffee component. A large scapula hoe and several perforated mussel shells (hoes?) may be unique due to a similar cause—the existence of special conditions favoring preservation. Unlike those on Fort Coffee ware, designs on vessels of the Moore component were executed with precise engraving and incising techniques (Fig. 33). Bowls were relatively rare and, in the main, lacked lip tabs. Jars predominated, the main form being a small jar with tall, slightly outflaring rim and inverted pear-shaped body. Definitely unique traits included hemispherical bowls with short, inward slanted rims on which were bands of crosshatched triangles, and a necklace of small disk turquoise beads found on an old male skeleton. The turquoise beads were the only recognized suggestion of contact with the Southwest found in the Spiro area.

The Littlefield Component (Li. 1)

The Littlefield site, a 10-acre area located approximately 2 miles southeast of the Spiro site, was situated on a terrace 8 feet high overlooking an old stream channel (SW¼ of the SW ¼ of Sec. 34, T 10 N, R 26 E). Frequent flooding by the Arkansas River had deposited a silt mantle nearly a foot thick over the fifteen house sites and four burials. The sandy nature of the subsoil afforded excellent drainage and further protected the site. A large quantity of pottery, chipped and ground stone artifacts, and a few bone and shell artifacts came from the house sites.

Time allowed for the excavation of only five of the house features. Each was rectangular, with two center posts and a baked clay fireplace. They varied in size from 14×9.5 feet to 22×16.5 feet. Their orientation was similar to that of houses of the Late Spiro component, but unlike that of those of the Fort Coffee

component, in that long axes were oriented in the cardinal directions, four east-west and one north-south. Two houses had baked clay floors. The refuse pits were hemispherical in form, 3 feet in diameter, and 2–4 feet deep. They contained sherds, animal bones, shell, fragments of manos, and much ash.

The four burials represented primary, individual interments, three of which were semiflexed, and the fourth, extended. Each burial was accompanied by a terrapin shell (rattle?), one contained a sherd, and one a bone awl. The main burial ground of this component had apparently not been discovered.

Distinctive Traits of the Littlefield Component.—A considerably greater proportion of clay-tempered ware (similar to Spiro 2 type) occurred here than in the Fort Coffee or Moore components. This fact, along with the occurrence of oval chipped slate hoes and small stemmed points, in addition to types characteristic of the Fort Coffee focus, strongly suggests a closer relationship to the Spiro site. The presence of baked clay floors in houses which were, moreover, oriented according to the cardinal directions further supports an assumption of relationship.

Relative Chronological Position of the Units of the Fort Coffee Focus

In attempting to fit the Fort Coffee components into a chronological sequence two facts were considered: (1) ceramic traits of the Bowman-Skidgel site (Fort Coffee component) most closely resembled those of the historic Caddo horizon of Louisiana; the decline in the ceramic art further suggests a late occupation, and (2) the Littlefield component more closely resembles the (assumed) parental Late Spiro component. In addition, the Moore component, with its precise execution of designs and simplified spiral motifs, resembles Late Spiro to a greater extent than does the Fort Coffee component. It is therefore suggested that the Littlefield unit is earliest, the Moore unit next, and the Fort Coffee unit latest.

Fort Coffee Ceramic Types (Figs. 33, 34)

The following types serve to set off Fort Coffee ceramics from those of other units in the Spiro area. Further breakdown of types, particularly that of Fort Coffee 1 type, will be necessary as intrafocus problems undergo more intensive research.

Fort Coffee 1 Type: (approximately 80 per cent of vessels). Temper: medium (most) to large particles of shell; in locations where drainage is poor, shell leeched away, leaving pockets. Texture: coarse, contorted, flaky, friable. Hardness: 2–3. Color: brown (most), red-orange, yellow (rare). Thickness: .3–.6 cm., average .5 cm. (burial pottery), .4–.9 cm., average .6 cm. (village pottery). Surface finish: rough porous or smoothed depending on leached condition of shell tempering, red filmed (rare), brush-marked (very rare). Form: jars: (1) small jar with globular or inverted pear-shaped body (majority in Moore site) and tall, slightly outflaring rims, (2) small "spitoon"-shaped jar (one case, Fort Coffee component), (3) tall jar with prolate spheroid body and slightly outflaring rim (one case, Moore site); bowls (a majority in Fort Coffee component): (1) wide hemispherical bowl (most), (2) bowl with short vertical rim barely differentiated from hemispherical body, outflaring lip, (3) bowl with wide, globular body with slightly outflaring rim, (4) hemispherical bowl with sharply inclining short rim (exclusive at Moore site, common here), (5) conical bowl with very short inclined scalloped lip (one case, Fort Coffee component), (6) hemispherical bowl with four opposite, spheroidal rattles on rim (one case, Fort Coffee component); bases flat disks (most), round (rare); lips rounded or flattened. Decoration: technique: carelessly engraved designs predominate though precisely executed incisings are seen in Moore site, many have "lead" line designs,[32] nail punctates (very common), small diagonal gashes on lip (rare), hemispherical nodes and short, elliptical lip tabs, appliqué ridges notched and plain. Arrangement: most designs occur in horizontal bands encompassing rim section; lip tabs occur at four opposite points on lip; motifs commonly repeated four times but range up to ten. Motifs: linear (most), curvilinear (few): (1) nested "V"-shaped elements, (2) crosshatched triangles (Moore site only), (3) band of nail punctates (jars especially), (4) rows of nodes on body, (5) closely spaced parallel lines on rim (rare), (6) concentric circles in recurring motifs. Elements in addition to those mentioned above: ladder, linear and curved spurs, diagonal line hachuring (very common), negative elements (circle, etc.) defined by hachuring

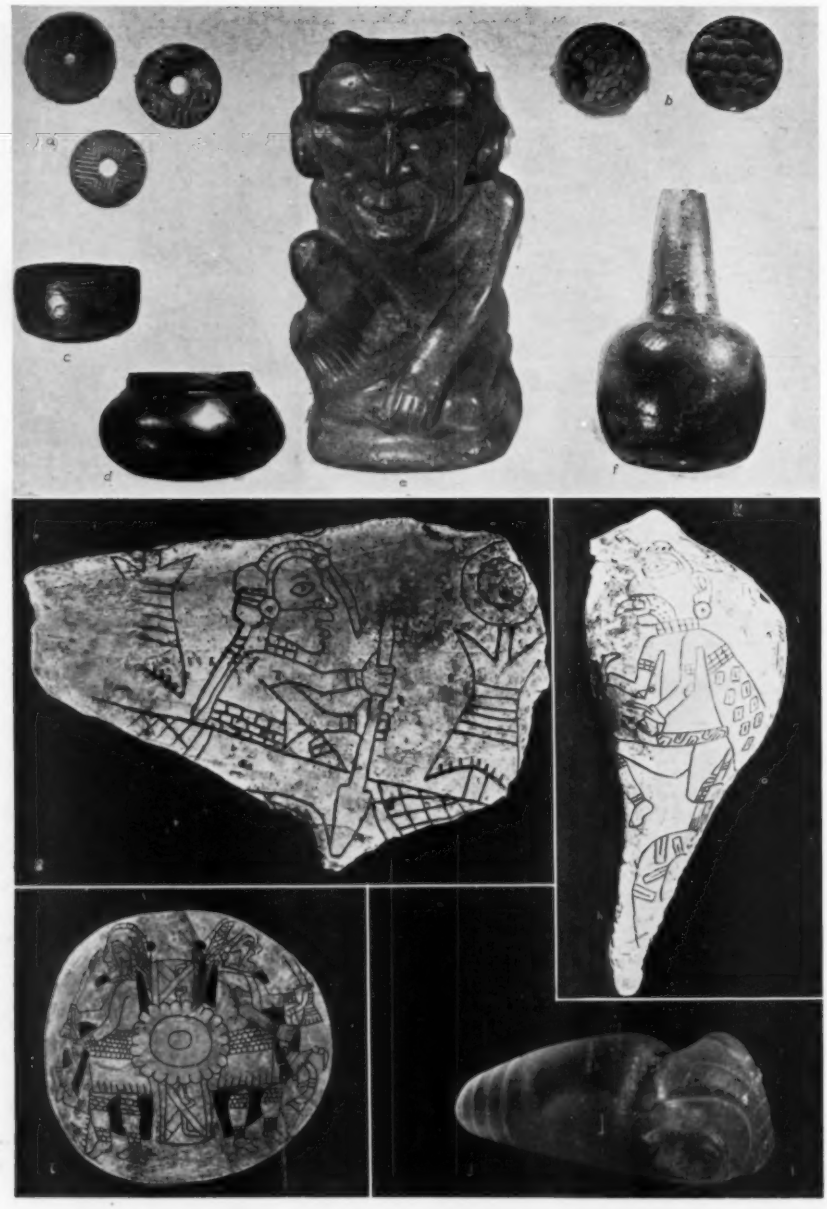
Fort Coffee 2 Type:[34] (few burial vessels, few village sherds). Temper: fine particles of shell. Hardness: 2.5–3. Color: dark brown and black. Texture: fine, compact. Thickness: average .5 cm. Surface finish: smoothed to highly polished. Form: restricted mainly to bottles: (1) with hemispherical body or gradually tapering shoulder, cylindrical or bulging neck, disk bases and rounded lips. Decoration: very precise engraving on entire body. Motifs:

[32] The use of some type of pigment (galena, charcoal?) for preliminary sketches prior to engraving might explain the very precise execution of complex designs on vessels of the Spiro area. The casual Fort Coffee component people may have been satisfied with the initial sketch for decorating their vessels.

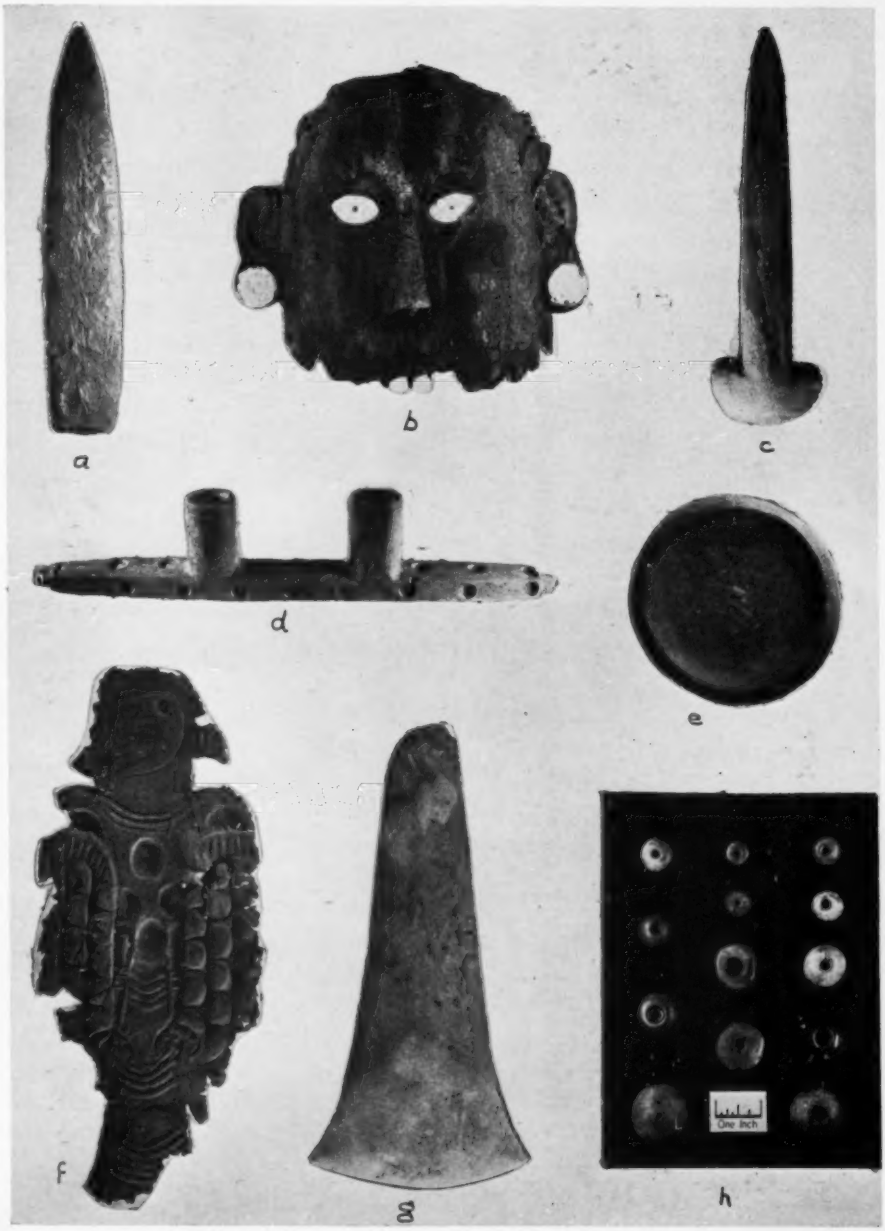
[34] Majority of Fort Coffee 1 and 2 type traits are illustrated or mentioned in Ford, 1936, as Caddoan types, p. 85, Fig. 16, 17 ff. Types figured by Walker as belonging to Natchitoches, Ouachita division of the Caddo Confederacy (1680) are very similar to Fort Coffee component types. Walker, 1935.

FIG. 34.—Artifacts of the Fort Coffee focus. *a–g*, pottery; *h–r*, *cc*, chipped stone; *u*, *v*, *y–bb*, ground stone; *t*, *x*, bone; *s*,*w*, shell. *b*, *c*, *d*, Fort Coffee 1 type; *a*, *e*, Fort Coffee 2 type; *f*, *g*, *u*, pipes; *h*, ensiform "drill"; *i*, *j*, *k*, *m*, blades; *n–r*, projectile points; *l*, "hoe"; *s*, perforated mussel shell; *t*, awl; *v*, long celt; *w*, bead; *x*, scapula hoe; *y*, mano; *z*, shaft polisher; *aa*, adz head; *bb*, pecking pebble; *cc*, scraper. Artifacts from Moore site (*a*, *i*, *j*, *k*, *w*, *x*) and Fort Coffee component. *a*, *b*, *c*, *h*, *i*, *j*, *k*, *l*, *s*, *t*, *v*, *x*, *y*, *z*, *aa*, *bb*, are ½ plate scale. Blades and points have thin, lenticular, cross sections.

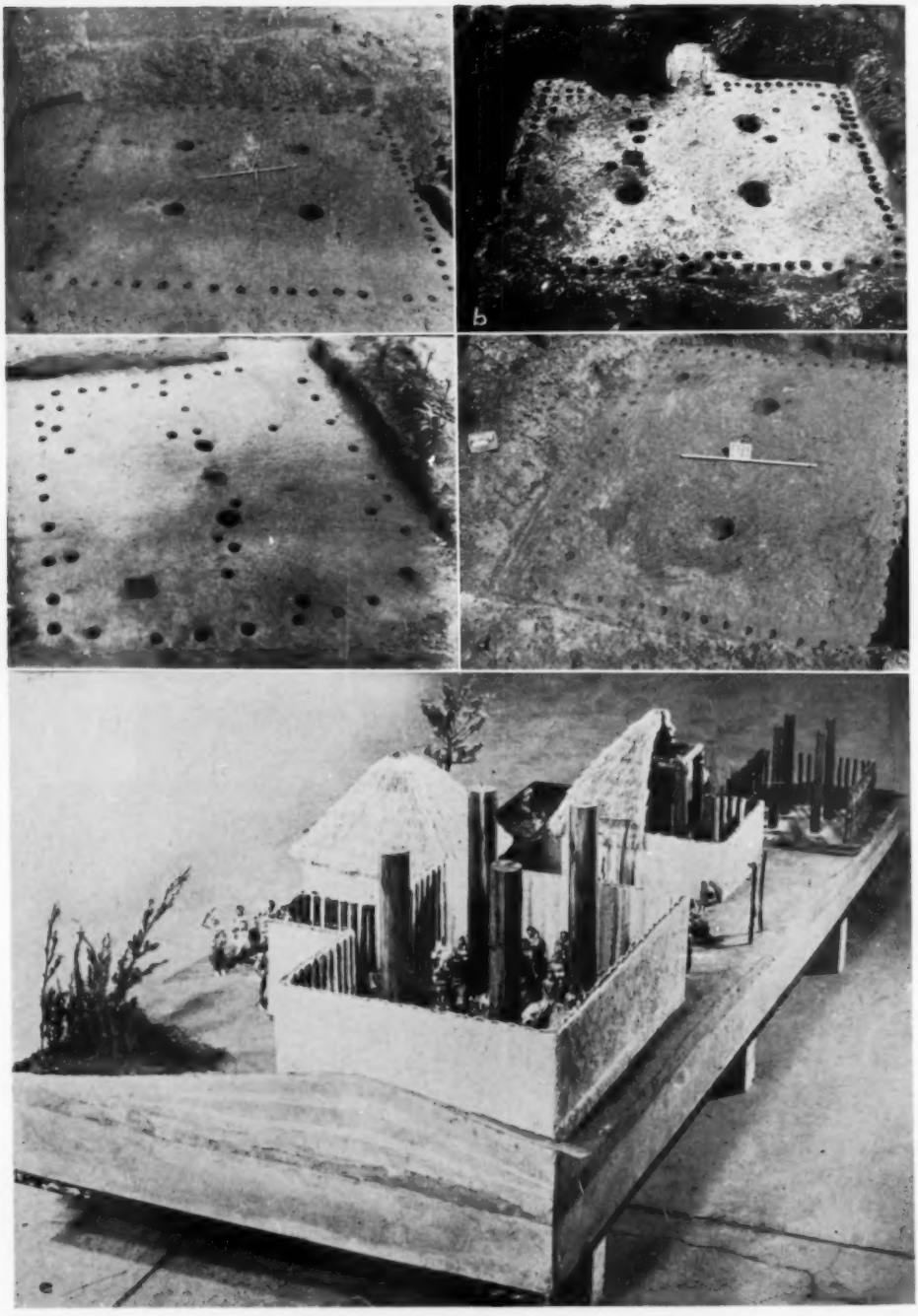
Site features and burials of the Spiro area. *a*, Conical section of the Craig mound, Spiro site, looking east; *b*, Middle component burial, Craig mound, Spiro site (Lf. Cr. 1, B62); *c*, Fort Coffee focus burial ground, Moore site (Lf. Mr. 3); *d*, Fort Coffee focus burial, Moore site (Lf. Mo. 1, B33). (Courtesy of the Museum, University of Oklahoma.)



Objects from the Craig mound, Spiro. *a*, *b*, bicymbal earspools showing traces of copper veneer (average diameter 7 cm.); *c*, *d*, incised and engraved bowls (greatest diameter approximately 13 and 18.5 cm.); *e*, stone effigy pipe (height 23.4 cm.); The bowl is in the head, and the stem aperture in the back. *f*, incised and engraved water bottle (height 28.8 cm.); *g*, fragment of incised conch shell container depicting man in canoe (length 15 cm.); *h*, incised conch shell container representing human in rattlesnake-deer ceremonial garb (length 27.5 cm.); *i*, incised shell gorget depicting human figures in ceremonial garb (diameter 16 cm.); *j*, quartz crystal boatstone representing locust (length 8.4 cm.). (Courtesy of the Museum, University of Oklahoma.)



Objects from the Craig mound, Spiro, Oklahoma. *a*, ceremonial flint blade (length 24.3 cm.); *b*, cedar mask with shell inlays and traces of copper veneer (width 18.5 cm.); *c*, spatulate celt of serpentine (length 20.6 cm.); *d*, double bowled stemmed pipe with pits for inlays (length 52.9 cm.); *e*, discoidal stone (diameter 9.1 cm.); *f*, embossed copper plate depicting eagle being (maximum dimension 39.2 cm.); *g*, polished flint celt (length 24 cm.); *h*, polished black stone beads. (Courtesy of the Museum, University of Oklahoma.)



House types of the Spiro area and model of reconstructed Spiro site Village (*c*). *a*, Early Spiro component type at Bowman site (Bo. 1, H1); *b*, Middle Spiro component type (Ev. 3, H1); *c*, Late Spiro component type (Jo. 1, H4); *d*, Fort Coffee focus type (Li. 1, H6a). (Courtesy of the Museum, University of Oklahoma.)

FIG. 35.—*a–k*, artifacts from the Braden Schoolhouse site, *l–p*, from the Choates component; *a–f*, Braden 1 type; *l–o*, Choates 1 type; *h–k*, chipped stone; *g*, pottery pipe; *h–i*, projectile points; *j*, blade; *k*, ensiform "drill"; *p*, clay ball with reed hole in top. *a–f* are ½ plate scale.

TABLE 2. DEFINITIVE TRAITS OF FORT COFFEE FOCUS
(see Fig. 34)

Partial Cultural Inventory	Fort Coffee Component	Moore Component	Littlefield Component	Ct. 2, Grid #1[a]	Bo. 2-Pr. 1[b]	Li. 2[c]	Li. 3[d]
Structural Complex							
Houses: Rectangular, two center post, wattle	x	x	x	x	x[e]	v	x
Post entrance	x	x	x	x	v		?[f]
Central fireplace	x	x	x	x	x		
Orientation according to cardinal directions			x		x		
Baked clay floor		x	x		x		
Refuse pits: hemispherical	x	x	x	x	x		
Burial Complex							
Burial ground: Cemetery type	x	x	x	v	v	v	v
Individual, primary interments	x	x	x				
Semiflexed and extended positions	x	x	x				
Mesocephalic, nondeformed crania	v	x	x				
Pottery clustered around cranium	x	x	v				
Cult paraphernalia absent	x	x	x	x	x	x	x
Ceramic Complex							
Fort Coffee 1 Type	x	x	x	x	x	x	x
Fort Coffee 2 Type	x	x	x	x	x		x
Fort Coffee 3 Type	x	x	x	x	x		x
Choates 1 Type	x			x			
Spiro 2 Type			x			x	?
Pipe: biconical elbow	x	x	x				
Ground Stone							
Celt: long elliptical	x	x	x		x		
Mano: rectangular with and without pits	x	x	x	x	x		x
Metate: oval, shallow depression	x	v	?		x		
Pipe: Elbow with tall bowl	x	x	x	x	x		
Bowl without stem			x				
Beads: Cylindrical of limestone					x		
Small disks of turquoise (trade)		x					
Shaft polisher: grooved of sandstone	x			?	x		
Pecking pebble: elliptical	x	v	?	x			x
Hammerstone: spheroidal			x	x	x		
Chipped Stone							
Projectile points: Small plain or notched triangular points	x	x	x	x		x	
Large points, shoulder, contracting stem	x	x	x	x	x	x	x
Small stemmed			x			x	
Large point, barbs, expanding stem	x	x	?	?	x		x
Blades: Long fusi-elliptical	x	x	x	v			
Diamond-shaped, reverse bevel edges	x	x	x				
Oval, core blade	x	v	?	x			
Flake blade	x	v					x
Drills: Expanding base	x	x	x		?		
Ensiform "drill"	x	x	v	x	?		
Scrapers: plano-convex	x					x	x
Hoe: Elliptical, chipped slate, ground blade			x				
Bone							
Turtle shell: Rattle	x	x	x				
Awl: deer ulna	x	x	x	x			
Hoe: Scapula		x					
Shell							
Beads: Tubular		x					
Mussel shell: Perforated (hoe?)		x					
Miscellaneous							
Charred corn	x				x		
Paint stone: limonite (red)		x	x				x

x—trait present in site indicated. v—trait not present due to nature of site as excavated. ?—fragments suggest presence of trait.

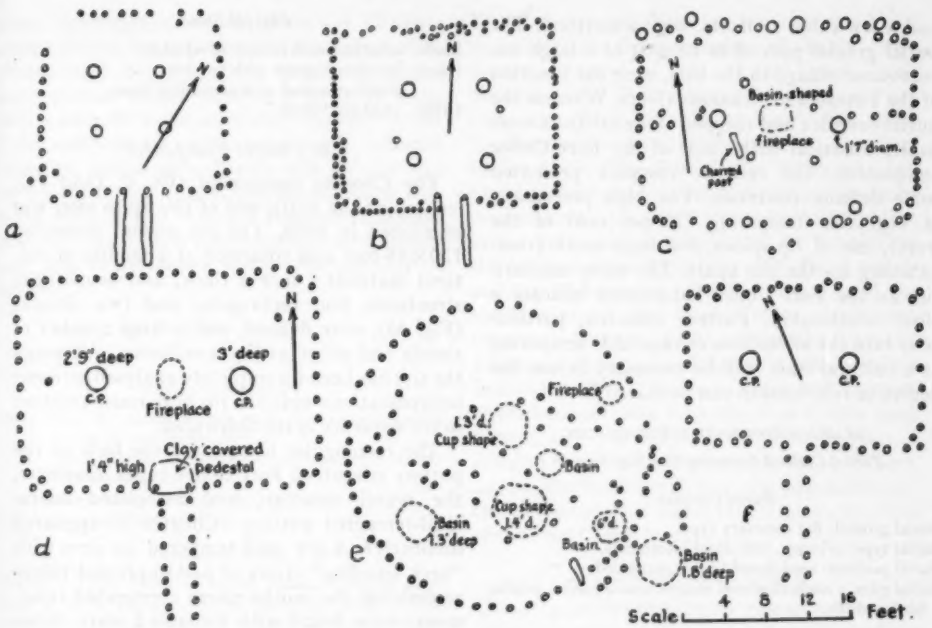


FIG. 36.—Plans of types of houses of the Spiro area in chronological sequence from early to late as follows: *a*, Early Spiro component, Lf. Ct. 2, H2; *b*, Middle Spiro component, Lf. Ev. 3, H1; *c,d*, Late component, Lf. Jo. 1, H1 and Lf. Ct. 2, H1; *e*, Choates component, Lf. Ct. 2, H4; *f*, Fort Coffee focus, Lf. Bo. 1, H1A.

(1) negative meander scroll with diagonal line hachuring in background (one case, Moore site), (2) concentric circle motif with negative circles, diagonal line hachuring (also "Z" elements and ovals), (3) curvilinear band of cross-hatching filled with red pigment (rare), (4) four-pointed "star" element, (5) wave-shaped spurs in thin hachured band.

Fort Coffee 3 Type: (very few sherds). Temper: vegetable, possibly charcoal, some grit. Hardness: 2.5. Texture: fine, compact, friable. Surface finish, form and decoration do not appear significantly different from Fort Coffee 1 type.

Choates 1 Type: (few sherds in Fort Coffee component). See decription in Choates component section below.

Spiro 2 Type: (few sherds at Littlefield component, more at Li. 2). See description in Early component section.

Braden Schoolhouse Burial Ground

In excavating the cellar for a schoolhouse at Braden, Oklahoma, in 1939, construction workers unearthed remains of a burial ground. The archaeological project secured permission to remove the burials as the construction work proceeded. Thirteen burials, accompanied by forty-five complete and fragmentary vessels

[a] See Choates component section.

[b] Four houses excavated.

[c] A series of tests revealed house mixtures but time did not allow excavation. Of one hundred and seventy-four sherds found in Li. 2 house mixtures, seventy-two were tempered with shell (Fort Coffee 1 type), fifty-four with clay particles, (like Spiro 2 type), twenty-eight with grit, eight with bone and sherd, and three with organic or vegetable tempering. The high proportion of clay, and bone and clay tempering is important. This site may represent a transitional phase between Late component at Spiro and the Fort Coffee focus.

[d] Six house sites excavated. Despite location on eroded ridge these houses were deep (2.5 feet average) suggesting a semi-subterranean floor not found elsewhere.

[e] Carl Ball excavated Pr. 1 in 1937 and reported a unique rectangular house, 30×20 feet, with a baked clay wall, 1 foot high, around the house outline. Baked clay floor, long axis orientation in east-west direction, and thirty or more posts flanking wall on the outside were reported.

[f] Trench entrances suggested here.

and a few other artifacts, were unearthed. The burial ground proved to be part of a large unexcavated village to the east, near the junction of the Poteau and Arkansas rivers. Whereas the burial complex and chipped stone artifacts were nearly identical with those of the Fort Coffee component, the ceramic complex presented some definite contrasts. The high percentage of vegetable tempering (26 per cent of the ware), use of lip nodes, and large mesh crosshatching set the site apart. The many similarities to the Fort Coffee component indicate a close relationship. Further research, particularly into the affiliations of vegetable tempering as a cultural trait, will be necessary before the degree of relationship can be stated.[25]

BRADEN SCHOOLHOUSE BURIAL GROUND

Partial Cultural Inventory (See Fig. 35 *a–k*)

Burial Complex

Burial ground: flat cemetery type.
Burial type: primary, individual interments.
Burial position: semi-flexed (most), extended.
Burial gifts: vessels clustered around crania; pipes, points, blades, drills.

Ceramic Complex

Braden 1 Type: (81 per cent of vessels).[26] Temper: vegetal, possibly charcoal, leached shell, vegetal and shell combined. Hardness: 2.5. Texture: fine black paste, compact, friable. Color: dark brown and red-orange (most). Thickness: .4–.7 cm., average .6 cm. Surface finish: rough to smooth (most), red-orange film (most). Forms: bowls: (1) small and large hemispherical bowls, (2) wide bowl with short vertical rim, round base (no decoration), (3) large, wide hemispherical bowl with long outflaring rim; jars: (1) globular jar with vertical rim and rolled lip, (2) small globular jar of above type with four-pointed rim, (3) small, globular jar with slightly outflaring rim; disk bases and rounded lips predominate. Decoration: nodes and tabs on lip (only decoration on bowls), and incising in bands on rim. Bowl motifs: (1) four elliptical tabs placed opposite on rim, (2) small ellipsoidal nodes in four groups of three each or in continuous band around lip. Jar motifs: (1) band of large mesh crosshatching on rim, with clusters of short, notched appliqué ridges at intervals, (2) body nodes, (3) body appliqué ridges, (4) carelessly executed parallel lines in band on rim, and two-line zigzag elements in haphazard manner on body (jar (3) above), (5) band of diagonal hachuring on rim (jar (2) above).

Pipes: three pipes, all clay elbow type, with shell and vegetable tempering, one with red film and wide disk top on bowl.

Chipped Stone

Blade: elliptical with reverse bevel edge.
Points: Small triangular with notches.
Small stemmed with expanding base.
Drills: ensiform "drull.".

The Choates Component

The Choates component (Ct. 2, Grid #1), located at the north end of the Spiro site, was excavated in 1938. The excavation measured 120×55 feet and consisted of a mantle of cultural material 8 inches thick, and houses. Six structures, four rectangular and two circular (Fig. 36), were defined, and a large number of sherds and other artifacts collected. Although the site has been incompletely analysed, present interpretations indicate its important position in the sequence in the Spiro area.

The rectangular houses and the bulk of the pottery resembled Fort Coffee types. However, the round structure and associated coarse shell-tempered pottery (Choates 1) appeared distinctive. A few shell-tempered jar rims with "neck banding" (rows of nail-impressed ridges resembling the southwestern corrugated treatment) were found with Choates 1 ware. Since the structures were in superimposed position the question of contemporaneity was raised. It was first thought that two components were represented. Although the Fort Coffee pottery types were commingled with Choates 1 pottery, the Choates ware was mainly segregated in the round houses and in cache pits. However, comparisons with "Caddoan" cultures in northeastern Texas, where both pottery types occur together with the round house, strongly suggested that the Choates component also included the Fort Coffee elements (see footnote 69).

A preliminary study of the Fort Coffee elements in the Choates component indicates as early Fort Coffee types rectangular houses oriented according to the cardinal directions and with double wall posts, and polished brown ware with cross-hatched engraving and notched spurs, being similar to late Spiro component traits. The round house[27] is not found in the later Fort Coffee units, but Choates 1 sherds and possibly derivative types do occur. A ten-

[25] The relationships of the Hall site are also unknown (Fig. 30).

[26] Other wares, defined only broadly to date, include: (1) clay-tempered ware with rough and smooth surfaces, and (2) grit-tempered ware with smooth brown and red filmed surfaces.

[27] Joutel, lieutenant of LaSalle, describes the circular houses of an unnamed Caddoan group in Western Louisiana (1687): Joutel, in French, 1846, p. 149. The round house is not restricted to the historic period. Krieger indicates its occurrence in several prehistoric "Caddoan" units in northeastern Texas. (Personal communication.)

tative interpretation would place the Choates component at the beginning of the Fort Coffee period, with the recognition that some of its traits (round house, Choates 1 pottery) stem from a cultural tradition other than that of the Spiro components. This suggests a cultural intrusion, which undoubtedly affected the development of the Fort Coffee focus, at the end of the Spiro period. Further research is needed to clarify the difficult archaeological situation here and to determine finally the position of the unit.

THE CHOATES COMPONENT

Partial Cultural Inventory (See Fig. 35 *l–p*)

Structural Complex

House: Circular structure with short curved entrance (24 and 28 feet diameter).
No wattle, no center posts, no fireplace; probably grass hut.
Sub-floor burial (infant).
Cache pits: small hemispherical.

Ceramic Complex

Choates 1 Type: (most in round house). Temper: large flakes of shell. Texture: coarse, contorted, flaky. Hardness: 2.5–3. Color: light brown and dun shades. Thickness: .5–.8 cm. Surface finish: coarse and rough. Form: jar: large jar with long, slightly outflaring rim, slight collar on lip, globular body; bowl: conical bowl with elliptical horizontal cross section; flat disk bases. Decoration: rows of deep gash incisions and deep punctates on rim, small vertical ridges in middle of rim, tabs on lip.

Pipe: shell-tempered, clay elbow.

Chipped Stone

Projectile points: Small triangular points with or without outside notches. Large stemmed points
Scraper: plano-convex

Ground Stone

Shaft polishers: of sandstone with four grooves
Hammerstones: sphercidal
Manos: rectangular
Metates: shallow depression, oval form

Other Artifacts

Clay: Double sphere ball with hole in top for reed ("standard bearer"?)
Bone: Scapula chisel
Awl: deer ulna
Shell: perforated mussel shell (hoe?)

RELATIONSHIPS BETWEEN UNITS OF THE SPIRO AREA

Chronological Relationships

Stratigraphy of the Craig and Brown mounds gave validity to the sequence of Early, Middle, and Late components within the Spiro site. Two facts of typology further supported the sequence: (1) the similarity of Early component material to that of the Coles Creek horizon, and (2) similarities between material from the Late component and that from Harrington's "Caddoan" sites and the Fort Coffee focus. The Fort Coffee focus was not found in stratigraphic relationship to the Spiro components. Its late chronological position in the Spiro area was indicated by typological similarities of the Littlefield units (Li. 1 and 2) and the Moore unit with Late Spiro, and the similarities of the Fort Coffee component (Bowman-Skidgel sites) with the historic Caddoan horizon as defined in northwestern Louisiana. The Choates component demonstrated connections with the Fort Coffee component and probably represented, in part, a cultural intrusion following Late Spiro. Whereas the Braden Schoolhouse site presented special problems, it is undoubtedly an early phase of the Fort Coffee focus.

Cultural Relationships

At the present stage of research the facts indicate a cultural continuum from Early Spiro through latest Fort Coffee. The considerable diversity of culture seen here may be explained on the basis of cultural change in which the presence or absence of the Southern Cult played a dominant role.

There is little doubt of the continuum seen in the sequence from Early to Late components at the Spiro site. These units were in stratigraphic sequence and contained sufficient traits in common to indicate a continuous growth of the same cultural tradition. New elements made their appearances, but these probably indicate strong outside influences impinging on the main flow of culture. Similarities between Late Spiro and the Fort Coffee focus in types of houses as well as artifacts point to the latest Spiro period as a transitional period following the decline of the Cult. The Littlefield sites further show a fusion with traits of the Spiro component and lend support to the idea of gradual cultural change. Whereas the chronological position of the Braden Schoolhouse site is not clear, it also stems from the same cultural tradition which produced the Fort Coffee focus. Sharp contrasts between the Choates component and the Spiro-Fort Coffee continuum suggests an intrusion stemming from a different cultural tradition, and possibly accompanied

by a change of population following the latest period of spiro occupation.

RELATIONSHIPS OF UNITS OF SPIRO AREA WITH THOSE OF OTHER AREAS

Unfortunately, the confines of this paper allow only a brief treatment of complexes affiliated with units of the Spiro area. Much research has been undertaken on this problem[28] but complete tabular presentation must await further publication.

Cultural Units Related to the Early Spiro Component

The presence of Coles Creek and French Fork ceramic types in earliest Spiro levels has been cited above and serves to tie Early Spiro with the Coles Creek horizon as defined in Louisiana.[29] In addition, Early Spiro material bears a close similarity to Crenshaw 1 material from the "pre-Caddo" site on the Red River in southwestern Arkansas,[30] a manifestation recognized as belonging to the Coles Creek horizon.[31] Specific similarities include: group burials in low elliptical mounds, cremations, caches of small stemmed points with flaring blades, shell beads, boatstones, and caches of small pebbles (rattles?). Ceramic types which have exact conterparts in Early Spiro include: (1) square-based jars, (2) bowls with triangular cross sections, (3) conical bowls, (4) square-based cylindrical jars.[32] Designs with stippled background, typical of Crenshaw 1, are also found in Early Spiro but are not dominant. As in Early Spiro, Crenshaw 1 lacks Cult paraphernalia and underlies later horizons which have "Caddoan" affiliations (Crenshaw 2). The relative sparseness of Coles Creek material at Spiro suggests that it represents a terminal point of the horizon prior to the development of the "Caddoan" horizon.

Relationships of the Middle Spiro Component

The presence of Cult paraphernalia in cultural units does not necessarily indicate close relationship with the Middle Spiro component, though it may suggest contemporaneity. Waring and Holder have shown that the Cult occurred throughout the Southeast with a high degree of homogeneity.[33] Consequently, those traits which are most likely to have stemmed from local cultural traditions, especially types of houses and ceramics, were considered as diagnostic.

The Spiro Focus

Five sites were seen to have sufficient similarities in types of features and artifacts to justify inclusion along with the Middle Spiro component in a Spiro focus.[34] The sites are: (1) the Groseclose site (Mi. Gr. 1) on the Canadian River near Eufaula, Oklahoma,[35] (2) the Brackett site (Ck. Bk. 1) near Tahlequah in northeastern Oklahoma,[36] (3) the Norman site on the Grand River near Wagoner, Oklahoma,[37] (4) the Gahagan site on the Red River in northwestern Louisiana,[38] and (5) the Mineral Springs 4 site, on a tributary of the Red River, in southwestern Arkansas.[39]

Cult paraphernalia, minus conch shells and other organic artifacts in some cases, perhaps decomposed, were found in each site. The mound, burial, house, ceramic, chipped and ground stone traits of each were nearly identical with those of the Middle Spiro component. Thin, highly polished, brown and black ware with engraved designs based on spiral and scroll motifs (similar to Spiro 5 type) was the dominant funerary pottery in each site. Other traits shared in common included: small stemmed points, ground stone earspools, pipes and celts, and shell beads. In the Groseclose mound fully seventy-one of the total seventy-eight traits were those of the Spiro Middle component. House types, wherever found (Norman, Brackett, Mineral Springs 4), were the square or rectangular four center post type. The Norman site also had rectangular two center post houses (Late Spiro trait) and cremations in the lower mound levels (Early Spiro trait), suggesting that a cultural development similar to that seen at Spiro also took place here. The Norman site may prove especially useful in checking hypotheses of cultural change at Spiro.

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[28] Orr, 1941, N. D.*a*, N. D.*b*.
[29] Ford, 1936, Figs. 34, 35, 39.
[30] Lemley and Dickinson, 1936.
[31] Ford, 1936, p. 258.
[32] Lemley and Dickinson, 1936, (1) Pl. 8 *4*, (2) Pl. 10 *7*, (3) Pl. 8 *6*, (4) Pl. 7 *2*.
[33] Waring and Holder, 1945, p. 31.
[34] Orr, 1941, N. D.*b*.
[35] Excavated for the Creek Indian Memorial Association, Okmulgee, Oklahoma, by the writer in 1940.
[36] Excavated by Lynn Howard and the writer, 1939.
[37] Finklestein, 1940.
[38] Moore, 1912; Webb and Dodd, 1939.
[39] Harrington, 1920, pp. 23 ff.

Other Relationships of the Middle Spiro Component

Sayles describes a group of sites in northeastern Texas[40] which had burial mounds, earspools, boatstones, gorgets, small stemmed points, quartz crystals, shell ornaments, and pottery similar to types of the Middle Spiro component. Jackson divides the pottery of this area into four main types on the basis of the river drainages in which it is found.[41] Although all pottery types bear some similarity to types of the Middle and Late components, those of the Red River region are perhaps most closely related. As in the Spiro focus, the scroll is a dominant motif in Red River Caddoan ware, fully eighteen variations being distinguished.[42] At many sites, bone and clay tempering predominate. The incompletely described Sander's Place site, Lamar county, Texas, looks like a closely related component. Here, in group burials, were found typical Cult paraphernalia and pottery described as "highly suggestive of Natchez influence."[43]

The last phases of the Natchez culture[44] postdate the Middle Spiro component by a considerable time period. However, a marked similarity between the ceramic designs, based on interlocking scrolls with circle nucleus, small stemmed points, and burial types of the two cultures is highly suggestive of connection. The cabins and temples of the Natchez were square structures similar in ground plan to those excavated at Spiro. In addition, the Natchez possessed the Southern Cult.[45] Du Pratz's well known description of the death of the Spotted Serpent (1725)[46] and subsequent immolation and group burial of servants and relatives may supply a clue to the meaning of the Cult burials at Spiro. Whatever the relationship between the Natchez and Spiro people—Spiro may be in an ancestral role—the Natchez may be considered as having traits of the Spiro focus in the purest form in which they occurred in the historic period. A study of the social, religious, and political institutions of the Natchez, as a possible means of throwing light on the nature of the Southern Cult, should be given serious consideration.[47]

Relationships of the Late Spiro Component

The Late Spiro component is regarded as the product of a culture possibly transitional between that of the Spiro focus and that of the Fort Coffee focus. The affiliated sites in other areas support this contention, each having an apparent fusion of earlier and later traits. It is important to note that each unit lacks Cult paraphernalia.

Hughes Site

A large, truncated quadrilateral mound (175×19 feet), near Muskogee, Oklahoma, surrounded by a village and cemetery site, was excavated by Lynn Howard, for the WPA archaeological project, in 1938. The mound contained few artifacts but may have supported a ceremonial structure. Nearby, a flat burial ground contained individually interred semiflexed burials. The following Fort Coffee traits were found: shell-tempered ware, bone scapula hoes, small triangular points, plano-convex scrapers. In addition, earspools, copper ornaments, and Late Spiro pottery designs were found. The house types included square, four center post, and rectangular, two center post structures.

Ozan-Washington Sites

Similarities in the ceramics of Late Spiro and Harrington's Ouachita River sites in southwestern Arkansas[48] has been noted above. The complexes of features and artifacts also have sufficient similarities to indicate close relationship: large truncated pyramidal mounds used as foundations for structures, square or rectangular houses with prepared clay floors, ground stone celts, large oval "hoes," spurred disk earspools with bipartite inner disks, and small stemmed points in a variety of forms. Harrington considered these sites to be "Caddoan" on the basis of the occupation of the region by Caddoan-speaking peoples in historic times. The sites, however, lack trade goods; and Walker points out that the pottery does not resemble to any great degree the ceramics of the Natchitoches, an historic Caddo village

[40] Sayles, 1935, maps C, D, E, Table 7.
[41] Jackson, 1934.
[42] *Ibid.*, p. 52.
[43] Pearce, 1932, pp. 680 ff.
[44] Ford, 1936, Figs. 7, 9; Quimby, 1942.
[45] Waring and Holder, 1945, Fig. 7.
[46] Du Pratz, (1758) 1940.
[47] Ethnohistorical data on the Natchez are relatively extensive; *idem;* Margry, 1878; Du Pratz and Iberville, in Swanton, 1911.
[48] Harrington, 1920.

dating about 1690.[49] Natchitoches ware is very similar to that of the Fort Coffee focus, as indicated above. Since Ozan-Washington types at Spiro are earlier than the Fort Coffee focus, it is probable that Harrington's "Caddo" represented a late protohistoric culture which finally developed into the historic Caddo culture.

Relationships of the Fort Coffee Focus

The close similarity of historic Caddoan wares, as described by Ford and Walker, to the Fort Coffee wares has been noted above. Few other types of artifacts are available in the literature for comparison. We may note, however, that flat burial grounds were common among the historic Caddo. The lack of trade goods in the Fort Coffee focus is undoubtedly the result of the peripheral position of the units of the Spiro area.

Another group of sites, excavated by Moore and widely scattered in Louisiana and Arkansas,[50] have reference to the Fort Coffee focus. The sites, Canebrake, Greer, Battleplace, Glendora, and Keno, share a large number of traits in common and may be considered as components of a "Glendora focus."[51] The presence of quantities of White trade material at the Glendora and Keno sites indicates the late historic position of the focus. Similar to Fort Coffee, the "Glendora focus" utilized flat burial grounds having single, extended and semiflexed interments with pottery clustered around the crania. The ground stone complexes are also similar. In addition, the two foci share many elements of ceramic design in common, including scroll-derived meanders, crosshatching (very common in "Glendora," rare in Fort Coffee), negative elements defined by background hachuring, and linear spurs. However, the treatment of design motifs as well as many of the forms of vessels are quite different. This difference probably derives from spatial rather than temporal factors. The evidence suggests that the "Glendora focus" was a "Caddoan" unit contemporaneous with, but occupying areas different from those occupied by the Fort Coffee focus. This interpretation further indicates the late, probably historic, position of Fort Coffee.

Cultural and Chronological Position of Units of the Spiro Area

The units of the Spiro area, from Early Spiro to late Fort Coffee, are regarded as representing a cultural continuum. This cultural sequence started at the close of the Coles Creek period and continued through protohistoric to historic "Caddoan" periods. The "Caddoan" culture block consisted of several divisions with both chronological and geographical distinctions. At Spiro, the earliest "Caddoan" division, the Middle Spiro component, centered around the Southern Cult. In the latest division, the Fort Coffee component, few traces remained of the once powerful Cult. It is interesting to note that the Natchez of Mississippi possessed a Cult organization and a cultural complex which had undeniable similarities to Spiro as late as the beginning of the eighteenth century, indicating a survival of a modified version of the Spiro complex and the Cult in this area.

A comparison of units of the Spiro area with the developmental stages postulated by Ford and Willey for Southeastern archaeology[52] places Early Spiro at the end of the Temple Mound I stage, and late Fort Coffee near the end of the Temple Mound II stage, at which time mounds were probably not in use in the Spiro area. Most units qualify for placement within the Middle Mississippi phase as outlined by Cole and Deuel[53] with the exception that pottery trowels are absent from all units, and Fort Coffee sites lack mounds and marine shells.

The problem of absolute chronology is still in the guessing-game stage and will probably remain so until datable trade materials or dendrochronology come to the rescue. Ford and Willey indicate that Coles Creek probably lasted until 1550 in Louisiana,[54] and that a movement up the Red River accounted for the virtual abandonment of the lower Mississippi area until 1700.[55] It is not improbable that the Spiro components and subsequent "Caddoan" components developed from Coles Creek in the four-corner area (Texas, Oklahoma, Arkansas, and Louisiana corners) from 1500 to the latter part of the seventeenth century, after which the cultural influences and peoples remigrated downstream. Walker's date of 1690 for the

[49] Walker, 1934, p. 104.
[50] Moore, 1909.
[51] Orr, N. D.*a*, p. 32.
[52] Ford and Willey, 1941, Fig. 6.
[53] Cole and Deuel, 1937, p. 36.
[54] Ford and Willey, 1941, p. 346.
[55] *Ibid.*, p. 352.

comparable Natchitoches culture aids in giving an approximate date for the latter part of the Fort Coffee focus.[56] Results of attempts at a cultural and chronological placement of units of the Spiro area, to date, may be tabulated as follows:

TABLE 3. CULTURAL AND CHRONOLOGICAL POSITION OF SPIRO AREA UNITS

Guess Dates	Spiro Area Units	Ceramic Horizon	Stage	Related Units
*ca.*1500	Early Spiro component	Coles Creek	Temple Mound I	Crenshaw 1 site Coles Creek of Louisiana
	Middle Spiro component	"Caddoan"	Temple Mound II	Spiro focus sites Red River "Caddo" (Natchez—1725)
	Late Spiro component	"Caddoan"	Temple Mound II	Hughes site Harrington's "Caddo"
ca. 1690	Fort Coffee focus	"Caddoan"	Temple Mound II	Historic Caddo of Louisiana ("Glendora focus")

THE PROBLEM OF THE SOUTHERN OR "BUZZARD" CULT

Facts gathered from research in the Spiro area to date may contribute to and aid in clarifying certain aspects of the problem of the Southern Cult:

1. Date: The Cult appears at the close of the Coles Creek horizon (Temple Mound I). There is no evidence of White contact in the Cult period or the subsequent Fort Coffee period; the latter, however, ties in typologically with historic period sites elsewhere. If Ford's date of 1550 for the closing period of Coles Creek is reasonably accurate, the Cult at Spiro is certainly post-Columbian and probably later than the 1540 De Soto date line. Further Spiro research may help clarify this important problem.[57]

2. Duration: The Cult flourished during the greater part of the Spiro occupation (Middle Spiro component), but after a short period of recession ended abruptly in the Late Spiro period.

3. Derivation: The Cult makes its appearance fully developed but utilizes certain materials and types of artifacts previously in the cultural tradition.

4. Influence: The Cult pervaded the ceremonial complex but the utilitarian complex remained largely unaffected.

5. Manifestation: The Cult is manifested in a florescence of the arts, seen especially in the excellence of workmanship in ceramics, ground and chipped stone, copper, wood, and shell.

In view of the last mentioned observation it is difficult to visualize the Cult period as representing the expression of a broken people declining in culture, as Ford and Willey suggest.[58] Griffin's interpretation of the Cult as "the Southeast at its apogee"[59] appears to fit the facts more closely. A general decline in culture set in following the Cult period, but even here sporadic instances of cultural excellence, as seen in the ceramic art of the "Glendora focus," may not be denied.

The derivation of the Cult presents perhaps the most controversial problems. The suddenness with which it appeared and diffused, and the readiness with which widespread societies of diverse cultural backgrounds[60] accepted the Cult, have challenged investigators. Two strong leads have been suggested to date: (1) Middle American derivation,[61] and (2) indigenous development as a revivalistic or "Ghost Cult" manifestation.[62] Without delving

[56] Walker, 1934, p. 100.

[57] Many workers on this problem postulate a protohistoric date for the Cult: Griffin, 1944 (post-1559); Ford and Willey, 1941, p. 358 (1600–1700); Bennett, 1944, p. 43 (post-1540). Waring and Holder, 1945, postulate a pre-Columbian inception (p. 29), but indicate a protohistoric development of the Cult (Fig. 7).

[58] Ford and Willey, 1941, p. 358.

[59] Griffin, 1944, p. 300.

[60] Waring and Holder have pointed out that the Cult appeared essentially intact in unrelated groups a thousand miles apart, as at Spiro, Oklahoma, and Key Marco, Florida (a community of hunters and fishers). Waring and Holder, 1945, p. 29.

[61] Recent contributors to this hypothesis include Phillips, 1940; Vaillant, 1932; Griffin, 1944; Bennett, 1944; Waring and Holder, 1945; Ford and Willey, 1941.

[62] Strong notes a possible connection between death symbols in Northwest Coast cultures and the Ghost Dance, and raises the question as to whether the Southern Cult might represent a similar revivalistic movement. Strong, 1945, pp. 259–260. This is also suggested in Waring and Holder, 1945, p. 29.

deeply into the details of the arguments, certain interpretations, as they have impressed this investigator, may be emphasized.

Phillips,[63] and Waring and Holder,[64] while stressing the strong Mexican flavor of Cult materials, point out that artifacts of Mexican manufacture have not been found in the Southeast, and that the Cult is expressed in unique techniques (which are assumed to be indigenous). The fact that the ceremonialism of earlier Southeastern periods will have to be considered in interpreting the later Cult aspects is stressed.[66] It may further be pointed out that basic cult elements such as conch shell containers, quartz crystals, boatstones, galena, group burials, pigment in burials, etc. occur as early as the Burial Mound I stage[66] and are consistently important ceremonial objects up to the advent of the Cult. This situation does not negate the many unique elements of the Cult, seen especially in the naturalistic art on conch shell, but it does suggest strongly that the Cult represented a fruition and culmination of an old ceremonial tradition associated with the dead. In stressing this interpretation we may not overlook the probable Middle American inspiration for many elements of the Cult.

Assuming that the Cult represented in part the culmination of an old ceremonial tradition, we have yet to explain its sudden florescence and widespread acceptance. Societies of diverse cultural background must have shared a strong concept in common to have uniformly accepted the Cult. Since, as we have argued, a protohistoric date for the Cult is indicated, the Southeastern cultures may have been simultaneously threatened by actual or anticipated aggression on the part of the European invaders[67] who, through De Soto, De Luna, and other Spanish conquistadors, had terrorized native societies by their violence in the Southeast and Mexico. In a word, each society may have been in a stage of culture crisis. Culture crises elsewhere have resulted in revivalistic movements in which societies rallied to some traditional institution, often religious, as a means of defense, even though actual contact between the conflicting cultures had not taken place.[68]

In view of the above considerations, the following interpretation is advanced as a working hypothesis: the Southern Cult may be regarded as an extraordinary florescence of essentially indigenous ceremonial institutions stimulated by a culture crisis, the crisis situation developing from a knowledge and fear of aggression from European invaders. The ceremonial institutions had undoubtedly been influenced by direct or indirect Middle American contact over a long period of time. Whereas Middle American influence conditioned the form of the Cult (basic concepts and artifact complex), the culture crisis situation was the motivation for the phenomenon.

CONCLUSIONS

Although the conclusions of this paper are, in the main, tentative because of incomplete research, certain strong leads have emerged. A brief résumé of these leads, summarized above, with notations on necessary future research follows:

1. Identity of units of the Spiro area: The identity of three Spiro components, a Fort Coffee focus, and a Choates component have been established in this paper. However, a full presentation of the wealth of cultural detail, especially that of the Spiro site, is needed, giving frequencies and percentiles for all traits. Such a presentation should include the excellent data recovered by Hamilton from the commercial excavation of the Spiro mounds.

2. Relationship between units of the Spiro area: Although a picture of a cultural continuum developing from Early Spiro through late Fort Coffee is strongly indicated in the data, a detailed comparison of traits manifested in features and artifacts must be undertaken to indicate clearly relationships of all cultural items. Such an analysis should result in a comprehensive picture of cultural change which may have wide application to the prob-

[63] Phillips, 1940, p. 356.

[64] Waring and Holder, 1945, p. 21.

[65] *Ibid.*, p. 22.

[66] Ford and Willey, 1941, p. 334.

[67] This theory would account for the presence of Cult elements in late prehistoric levels, as in Georgia (Waring, 1945, p. 57), as embryonic manifestations which later in protohistoric times flourished as a revivalistic Cult.

[68] "A crisis situation is the result of the inability of a culture to meet the situation in which it finds itself, by means of existing cultural patterns with the result that there is a definite, rather violent movement, in which existing cultural forms are changed or abandoned and new forms appear. This is extended to include an *unusual strengthening of native patterns* or a resistance to non-native cultural material or cultural patterns." Anthropology Seminar, Department of Anthropology, University of Chicago, Spring Semester, 1943.

lems of the "Caddoan" area. A series of other sites excavated in eastern Oklahoma have reference to units of the Spiro area and must be included in any comprehensive treatment of cultural relationships.

3. Relationships of units of the Spiro area to those of other areas: The interpretations identifying Early Spiro with the Coles Creek horizon, and late Fort Coffee with the historic Caddoan horizon, are supported by the comparable Louisiana sequence, and consequently it is felt that they are essentially sound. Further intensified comparisons are needed, utilizing complete cultural complexes as well as evidence of cultural contact with contemporary groups.

4. Cultural divisions within the "Caddoan" archaeological area: Data from the Spiro area have given a needed definition to certain cultural units within the "Caddoan" culture block units within the "Caddoan" culture block (Table 3) and provided a foundation for future interpretations of the protohistoric and historic cultures of the lower Mississippi valley. Future work should include a comparative treatment aligning the known sites into foci on the basis of chronological and cultural relationships.

5. The Southern or "Buzzard" Cult: The identification of the Cult with the Middle Spiro component, its sudden florescence and rapid decline, and the nature of the Cult as seen in the Spiro data are highly suggestive. The interpretation of the Cult as a reaction to a culture crisis of the late protohistoric period may prove fruitful as an approach for further analysis. Data pertaining to the Cult are especially copious at the Spiro site and full analysis should go far toward clearing up the important problems of this phenomenon.

It is hoped that this preliminary statement on the progress of research on the Spiro area may stimulate interest in the problems of the Caddoan archaeological area, and provide certain basic data for comparative purposes at this time. The complex problems of the Southern Cult and those of the Caddoan area in general will not be worked out over night, nor by a single individual. A start has been made, but the bulk of the work lies ahead. It is felt that the key to many problems of the Southeast lies in the large archaeological collection from central and eastern Oklahoma now at the University of Oklahoma. The writer hopes that this wealth of data may be made available to the science in published form in the near future.[69]

[69] After writing this paper, the writer visited Alex D. Krieger, at the Department of Anthropology, University of Texas, to become acquainted with recent research on the "Caddoan" units of northeastern Texas. He noted that the results obtained by Krieger in that area closely parallel results obtained in the Spiro area as regards broader cultural and chronological relationships. Krieger recognizes the Late phase of the Middle Spiro component as closely resembling his Sanders focus, and the Choates and Moore components as resembling his Texarkana focus. The Texas units are in the same chronological relationship as the units in the Spiro area. Krieger's current study on intrusive Pueblo sherds in Texas units gives encouraging promise of absolute dates. His reasonable doubts regarding simplified versions of the Cult emphasize the complexity of its problems—problems which call for close cooperation between interested workers if they are to be solved. (Personal communication, and Krieger, 1945.)

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FACTS AND COMMENTS

PIEDRA DEPRESSIONS

In his recent publication,[1] Hall disagrees with Roberts' interpretation of depressions found in conjunction with house units, as set forth in a report in 1930.[2]

Dr. Roberts' report includes the results of a thorough examination of eighty houses, two kivas, and six circular depressions.[3] It is the latter with which this comment is concerned. These depressions, according to Hall, are neither "borrow pits" nor "reservoirs," but probably mark the locations of former pit houses:

"The writer cannot help but feel that the majority of Roberts's Piedra 'reservoirs' are pit houses and that if these were defined they would resemble the Rosa Phase pit house in many respects."[4]

Hall agrees that the remains of the Piedra sites and those of the Governador are very similar, judging from surface indications.[5] Partially on this basis, he believes the Piedra depressions should contain pit houses. However, of all the six Piedra depressions excavated, except the kiva of House Group 2 in A Village, none contained any evidence of a pit house or similar structure! The kiva cited, measuring 21 feet east and west and 18 feet north and south, was in the center of a depression measuring 48 feet east and west and 51 feet north and south.[6]

Excluding the fill in the upper levels of the depressions investigated, which consisted of debris washed from abandoned house remains, the pits contained no refuse. Furthermore, the inhabitants of House Group C-3, instead of depositing their refuse in the depression close to their domiciles, as would be most convenient, carried it to the far side of the depression.[7]

Dr. Roberts' efforts to discover the purpose of these depressions are reflected by the following statements:

"The circular depression of the unit [C-3] presented the same features mentioned in connection with those of C-1 and C-2. Over half of the debris which filled it was completely removed in order to make doubly certain that there could be no mistake in the conclusion that it had served as a reservoir."[8]

"Previous to these investigations the writer had always been skeptical over the suggestions that some of the circular depressions had served as reservoirs, but after the evidence obtained through hard and tedious excavation it does not seem possible to escape such a conclusion."[9]

Even though the reservoir sites were located on high points of land and were not, as Hall says, ideally placed for the collection of water, the run-off from the houses themselves would have contributed a great deal to their filling. Mexican workmen stated that when snow melted in the unit depressions throughout the Piedra district, the water remained in them for weeks. The workmen referred to them as "the little lakes."[10] It would have been ideal for the people living on the high mesas if these depressions had contained water for six months of the year, if not the year round. It must be remembered that adequate springs and stream courses were sometimes at great distances and that containers for carrying water were cumbersome. On the other hand, it is unlikely that the inhabitants were entirely dependent on the depressions as a permanent water source, but it is possible that they used them seasonally to supplement their water supply, otherwise transported over long distances and up steep ascents.

Hall's comparison of Roberts' reservoirs with Haury's irrigation ditches in the Snaketown area, on the basis of pottery occurrence in the ditches and its absence in the reservoirs, is poor.[11] The depressions would have contained a static water supply, whereas the irrigation ditches would not. Any pottery found in the latter might have been carried a great distance from its source.

One can agree with Hall that the size of the depressions when they were excavated by Roberts makes untenable the theory that they functioned solely as "borrow pits."[12] However, they may have served as such in the beginning and, having been found to retain water, may have been enlarged to serve as reservoirs.

This commentary on Hall's interpretation of the depressions excavated by Roberts in the Piedra district is not intended to determine the use to which they were put but rather to make clear the point that they did not contain pit house structures.

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THE FIRST THIRTY-EIGHT SANDIA POINTS

It has become almost an archaeological maxim that each new culture should be followed up with some dispersal studies. Most of these take the form of tabulations of typical cultural items that may be recognized out of context. If these are sufficiently distinctive, dispersion of the particular traits or characteristics may be traced with fair facility. Inherent in this supposition are some outstanding difficulties, nowhere better illustrated than in the case of the Folsom point. After the discovery of the Folsom site at Folsom, New Mexico, and the relatively quick realization that the Folsom point was distinctive and had a characteristic outline and peculiarities of chipping which could be recognized out of context, a fervent search was initiated to discover the dispersal of this element. Folsom points turned up over an alarmingly wide area, both in existent collections and virgin from the plow furrow. It was some time before the ensuing confusion was resolved to demonstrate that there were a classic Folsom and several allied forms which were variously termed "Folsomoid" or "channeled" points. To date, the relationship between the classic Folsom point and the Folsom cousins has not as yet been clearly demonstrated.

Nevertheless, in line with archaeological custom, the author has been busy compiling a series of notes which he had fondly expected to label, at some cherished date in the future, "The First Thousand Sandia Points." As the returns from the Sandia question, after the initial discovery

[1] Edward Twitchell Hall, Jr., *Early Stockaded Settlements in the Governador, New Mexico*, Columbia Studies in Archeology and Ethnology, Vol. 2, Pt. 1. New York, Columbia University Press, 1944.

[2] Frank H. H. Roberts, Jr., *Early Pueblo Ruins in the Piedra District, Southwestern Colorado*, Bureau of American Ethnology, Bulletin 96. Washington, 1930.

[3] *Ibid.*, p. 19.

[4] Hall, *op. cit.*, pp. 63–64.

[5] Hall, *op. cit.*, p. 62.

[6] Roberts, *op. cit.*, p. 33.

[7] *Ibid.*, p. 59.

[8] Roberts, *op. cit.*, p. 58.

[9] *Ibid.*, p. 59.

[10] *Ibid.*, p. 31.

[11] Hall, *op. cit.*, p. 63.

[12] *Ibid.*, p. 62.

of the Sandia Cave,[1] did not parallel expectations, the goal was modestly lowered to an expected publication on "The First 500 Sandia Points." Due probably to archaeological pessimism as a concomitant of war nerves, the present status of the question has been settled for under the present title. To date, only thirty-eight Sandia points have been identified with reasonable certainty.

The fact that Sandia points are scanty is information in itself. There seems enough evidence at the present time to make the statement that the Sandia culture, if it may be designated as such, was not as widespread nor as numerous in individuals as the Folsom.

The points which have been identified have been gathered over the last four years, for the most part following letters written to the author as a result of some popular knowledge of the Sandia Cave discovery percolating through the lay public. Out of a series of some 180 such letters, about thirty have proved to be concerned with authentic discoveries of Sandia points. These have been verified by actual visits to the sites in some instances, and by photographs, drawings, and descriptions in other instances. All dubious points have been excluded from this conservative thirty-eight.

It may be remembered that, according to the original Sandia Cave report, the stratification and typology seemed to indicate two types of Sandia points. One of these, labelled in the report Type Two, was a rather straight-sided point with a lozenge-shaped cross section and a feathered base, slightly reminiscent at the same time of Folsom and Yuma. This type was reported by Frank Roberts at Lindenmeier, although not associated with the Folsom levels. The other variant of the Sandia point, possibly slightly earlier in date, was characterized by more rounded outlines of generally lanceolate shape, but it had the characteristic side shoulder. The cross section is a flat oval, and the base is not thinned.

On the basis of the thirty-eight points thus far recovered, Type Two seems to be southern in distribution. Eight specimens have been recovered from southeastern New Mexico and counties of Texas immediately adjacent thereto. The lanceolate, Type One Sandia point seems to be northern and eastern in distribution, as eleven examples occur from central Oklahoma to western and southern Missouri and southern Iowa. The distribution of these finds looks extremely spotty. There is no concentration and conclusions gained therefrom are necessarily tenuous.

At present writing, there is no absolute certainty that the separation of the Sandia points into two types is valid. As a matter of fact, four of the Sandia points that have come to notice display characteristics of both types. Two of these four are from the Panhandle of Texas, one is from the Abilene region, and the other is from the extreme eastern section of Colorado. The rest of the points in the Sandia accumulation may be vaguely classified as one type or other, but without extreme conviction.

It must be remarked that several tempting Sandia points were thrown out of these classifications because of uncertain origin. The crux of the matter is that the origin of the point is as indicative of its Sandia connection as are the characteristics of the flint itself. In other words, Sandia points are difficult to recognize out of context. It is entirely conceivable that comparatively modern points and knives may have, from time to time, assumed the side-notched characteristic of the Sandia form. In all thirty-eight instances of the Sandia points mentioned herein, circumstances indicated considerable antiquity. In fourteen instances, points were found with extinct bones, although in each case by amateurs. The other specimens were derived under circumstances which would indicate extreme antiquity, such as considerable depth below the surface. This, coupled with the characteristics of the points themselves, seems to justify putting them in the *bona fide* class. One point in this category was a rather large piece found by Dr. L. S. Cressman under very suggestive circumstances in Oregon.

If the first thirty-eight Sandia points have indicated nothing else, they have certainly demonstrated the fallacy of depending merely on point typology. There is no reason to exclude the possibility that other hunting cultures contemporaneous with, or later than, Sandia Man used similarly shaped points.

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[1] Frank C. Hibben, "Evidences of Early Occupation in Sandia Cave, New Mexico and Other Sites in the Sandia-Manzano Region," *Smithsonian Miscellaneous Collections*, Vol. 99, Paper 23, Oct. 15, 1941.

THE KOLOMOKI MOUND GROUP, EARLY COUNTY, GEORGIA

The recent revival of interest in the Kolomoki site, little known except to southeastern archaeologists, has suggested that a short description would be of value. The mound group was described by C. C. Jones in 1873[1] as Messier Plantation Mound. Some random digging has been done from time to time, and several large collections of flint points have been removed. Dr. A. R. Kelly, Jesse D. Jennings, Robert Wauchope, and the writer have made surface collections which are now at Ocmulgee National Monument, Macon, Georgia. Through the interest of Dr. C. C. Harrold of Macon, Georgia, the group has become a state park under the jurisdiction of the State of Georgia. Dr. Robert Wauchope and the writer excavated a series of test pits along the site of a proposed road and found evidence of scattered house sites. Jones reports burials adjacent to the large mound. During 1940 and 1941 the writer investigated two small mounds which were to be flooded by a proposed recreational development. These mounds did not yield much material, and the bulk of the information comes from the surface collections.

The Kolomoki site is located on an elevated area approximately fifteen miles east of the Chattahoochee River, northwest of Blakeley in Early County, Georgia. To the east of the site is Little Kolomoki Creek, while a smaller unnamed stream heads slightly to the west. Both streams empty into the Chattahoochee. The land mass is highly dissected, and many ravines penetrate the area. The adjacent creek bottoms are typical cyprus-magnolia swamps. The site is approximately 2,500 feet long from east to west and 1,500 feet from north to south, and is slightly rolling with shallow draws to the drainage points. The underlying red clay is somewhat sandy, with local areas of fairly clean sand. There has been considerable modern sheet erosion.

The largest mound, 1 Er-4, is quadrangular, sixty feet high, 325 feet north to south and 200 feet east to west. The summit platform measures sixty-six feet by one hundred fifty-six feet. The sides are very steep, the corners well preserved and sharply outlined with a projecting ramp

[1] C. C. Jones, *Antiquities of the Southern Indians, Particularly of the Georgia Tribes*. New York, 1873.

on the east end. Just south of the mound and extending for a considerable distance east is a large open ditch, thirty feet wide and four to ten feet deep. It is quite evidently of aboriginal construction. North of the large mound is a smaller domed mound and a large pit which is presumed to be a borrow pit. West of the large mound is a domed mound about ten feet high, 1 Er-6. West of this is still another mound composed of sand and large hematite boulders, 1 Er-8. South of 1 Er-6 is a low domed mound, 1 Er-7, on which a modern house stood until recently. In the creek bottom directly east of the large mound are a small domed mound composed of sand, 1 Er-2, and a long low structure, 1 Er-3, evidently a dam or similar structure. 1 Er-2 was composed of various colored sands and resembled the sand burial mounds so common in Florida. A thin layer of black oxidized material at the base indicated the mound had been built on uncleared swamp land rich in vegetation. There was no evidence of subfloor pits or burials. 1 Er-3, 320 feet long, 30 feet wide, and 1.5 feet high, was composed of clean sand containing a few Swift Creek sherds. Lamar Complicated Stamped sherds were intrusive. Its shape and position across the creek bottom suggested it may have been a dam, although it could equally well have been a fish weir or ramp. The preponderance of evidence indicated construction in aboriginal times, but the period could not be determined. South of 1 Er-8 is what appears to be another mound, now the site of a modern cemetery. The village area extends for a considerable distance around the mounds. The higher ground north of 1 Er-4 and 1 Er-6 shows a higher concentration of sherds and flint than do other parts. Some small areas, about fifty feet in diameter, are discolored and may represent house sites. The mounds are arranged roughly around an open space which contains less surface evidence of occupation than other parts of the site. This may indicate the presence of a central court so typical of southeastern ceremonial arrangements.

Sherds are abundant and are principally of two categories. The earliest type is Swift Creek Complicated Stamped of a late style.[2] Plain grit-tempered sherds are in the majority and, being of an indeterminate nature, may belong to several categories. Pottery of the Weeden Island complex[3] seems to be well represented but is not as abundant as the Swift Creek material. A few sherds of Lamar Complicated Stamped, Plain Plaited Fabric-marked, Cord-roughened, and Check Stamped and one sherd of wickerwork marked were noted. These are probably trade sherds of the Swift Creek and Weeden Island periods. The presence of net- and fabric-marked and cord-roughened types in southeast Georgia is not common. Overhanging incised sherds were provisionally assigned to the Weeden Island complexes, as were two Rocker Stamped sherds. These may, however, represent trade sherds from the lower Mississippi Valley. The sherd summary is as follows:

Plain grit-tempered	3,835
Swift Creek complex:	
Swift Creek Complicated Stamped[4]	1,211
Weeden Island complex:	
Red Filmed	111
Weeden Island Incised	51
Incised	44
Punctated	34
Overhanging Incised	18
Carabelle Punctated ("fingernail")	9
Crosshatched Incised	7
Rocker Stamped	2
Zoned Punctate	1
	277
Miscellaneous elements:	
Simple Stamped	16
Cord-roughened	9
Napier Complicated Stamped	7
Plain Plaited Fabric-marked	3
Lamar Complicated Stamped	3
Net-marked	2
Check Stamped	2
Lamar Plain	1
Shell-tempered Plain	1
Wickerwork Marked	1
	45
Total	5,368

Few stone artifacts were found on the surface because of intensive collecting by individuals and commercial collectors. Stemmed and notched projectile points of medium size were occasionally picked up, however. Large flint "blanks" were fairly numerous. Most of the flint is of yellow, tan, or orange varieties which seem to be derived from pebble deposits in local streams. The large number of small oval pebbles battered on one or both ends found lead to the conclusion that some form of percussion chipping was practiced. Almost no ground stone tools and no pipe fragments were found.

At least three Indian groups have occupied the Kolomoki site. First, the Swift Creek group had a very extensive village there. The large amount of Swift Creek Complicated Stamped pottery indicates one of the larger settlements of these people. They are possibly also to be credited with the bulk of the brightly colored flint tools found; but whether or not any of the mounds can be ascribed to this group is uncertain. Swift Creek mounds seem to be of the domed residence type on other sites. The pottery seems to belong to a relatively late Swift Creek period, judging from the artistic styles. The great extent of the site may also be an indication of relatively late date. The Check Stamped, Cord-roughened, Napier Complicated Stamped, and net- and fabric-marked types have been found associated with Swift Creek in other locations, and it is possible that they are so associated at Kolomoki. The Simple Stamped may also be trade sherds of the Swift Creek period, although it is usually found at a slightly later date.

Along the west coast of Florida, north of Tampa, the Weeden Island complex developed in late Swift Creek times. It is characterized by round sand burial mounds containing distinctive, zoned, punctate pottery. This pottery is often in zoomorphic shapes and, in the sand mounds, is usually ceremonially "killed." Rocker-stamp and incised

[2] A. R. Kelly, *A Preliminary Report on Archaeological Excavations at Macon, Georgia*, Bureau of American Ethnology, Bulletin 119, 1938. Descriptions of these types are available in the Newsletters of the Southeastern Archaeological Conference.

[3] Gordon Willey and Richard Woodbury, "A Chronological Outline for the Northwest Florida Coast," AMERICAN ANTIQUITY, Vol. 7, No. 3, 1942. The writer is indebted to Willey for a clarification of the stratigraphic and areal position of the Weeden Island complex. My pottery types for this complex are derived from sample collections excavated by Willey and Woodbury which are now deposited at Ocmulgee National Monument.

[4] William H. Holmes, *Aboriginal Pottery of the Eastern United States*, Bureau of American Ethnology, 20th Annual Report, 1903, pp. 122–123; Clarence B. Moore, "Certain Aboriginal Remains of the Northwest Coast of Florida, Part II," *Journal of the Academy of Natural Sciences*, Vol. 12, 1902, Figs. 59, 64, 108, 168, 174, 205, 223, 224, 272.

types reminiscent of the Troyville and Coles Creek periods of Louisiana seem also to belong to the complex. Often sherds are found which seem to be identical with those from the lower Mississippi Valley. This complex spread north into Georgia for an uncertain distance. It is obviously represented by typical sherds at Kolomoki.

In Florida the Weeden Island sites do not, in general, have large temple mounds, but some large mound groups are known, and the large mounds at Kolomoki may belong to the same level. The small domed mounds like 1 Er-2 and 1 Er-8 are typical of the burial complex of Weeden Island, and it is felt that they probably belong to that period. The excavation of 1 Er-2 provided no definite evidence to justify the statement that it was a Weeden Island mound, but there was no good evidence that it belonged, to the Swift Creek period. It can be assumed that Kolomoki will yield considerable information about the Weeden Island complex.

A very few sherds assigned to the Lamar aspect were found, three of them in the excavation of 1 Er-3, the dam-like mound in the creek bottom. These three sherds were in an ambiguous position in 1 Er-3 and were probably intrusive. The very few sherds of Lamar types found in the surface collections from the village constitute too small a collection to justify assigning the mounds to Lamar. Small parties from larger Lamar sites in the general region may be responsible for the few sherds found.

Napier Complicated Stamped, Check Stamped, and Cord-roughened were found in such small quantities that they may be assumed to represent trade sherds. They are generally found in small quantities on most Swift Creek sites. Check Stamped is first found earlier than Swift Creek, but it extends up into the later levels. The Napier Complicated Stamped and Cord-roughened types seem to be contemporary with Swift Creek throughout most of the area. Simple Stamped, which is contemporary or slightly later than Swift Creek, was more abundant and may well represent a small occupation. More data are needed on the relationships of Swift Creek and Simple Stamped. The Net-marked and Plain Plaited Fabric marked types, which came into Georgia from the Virginia area, have only rarely been observed as far southwest as the Kolomoki region. They are, in general, later in Georgia than Swift Creek. In view of the late stylistic position of Kolomoki in the Swift Creek period, it is definitely possible that they are trade sherds in that horizon.

The Kolomoki Mound Group does not yield any of the pottery types associated with historic tribes. It must be assumed that it was abandoned at the close of the Weeden Island occupation with some very slight visitations by people of the Lamar aspect. Although it has been suggested as the site of Kolomi,[8] this does not appear possible, in view of the early nature of the remains. The site is in a critical position between the areas of the Swift Creek and Weeden Island complexes, and it is the largest site with a heavy deposit of Swift Creek Complicated Stamped pottery. Since the Swift Creek aspect is evidently an indigenous development in the Southeast, centering in Georgia, and Weeden Island seems to the writer to be a refocalization of elements from the lower Mississippi Valley in the northwest Florida area, Kolomoki, as a large group, can be expected to yield considerable information concerning the interaction of these two groups. It seems to be definitely earlier than the large mound groups like Ocmulgee, Etowah, and Moundville to the north and Lake Jackson to the south. An answer to the question of which group built the mounds at Kolomoki will have to wait on excavation. It has at present a fair degree of protection as a state park and can be regarded as a "reserve archaeological area" for future excavation. With proper excavation and preservation, it should add materially to our information on the Swift Creek and Weeden Island occupations and extend the series of "in place" museums so well begun in the southeast.

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[8] John R. Swanton, *The Early History of the Creek Indians and Their Neighbors*, Bureau of American Ethnology, Bulletin 73, 1922, p. 267.

NOTES ON A FIND FROM TRINIDAD

During two years of duty at the Naval Operating Base, Trinidad, British West Indies, the author had the good fortune to gain the friendship of a local geologist and savant in the field of archaeology. He is Mr. J. A. Bullbrook, Honorable Secretary, Archaeological Section, Historical Society of Trinidad and Tobago. Mr. Bullbrook resides in the southern portion of the island of Trinidad near Erin, in an area which at one time was well populated by aboriginal migrants from the mainland of South America.

Rather recently the author received a letter from Mr. Bullbrook describing the accidental discovery of an effigy vessel by a native workman in his neighborhood. The paragraphs which follow are excerpts from Mr. Bullbrook's letter.

"... The enclosed photograph represents an aboriginal water 'goblet' found not long after your last visit here.

"... You will note that the pot has been broken at the neck. Most of the broken surface indicated old fracture —concerning the meaning of which more later—but there were also obviously two small new fractures made in the digging by which the vessel was found. And so to the story. On my return home one evening last February, I found my cook in a state of frantic excitement and 'wropped in mystery.' With the same air of mystery she led me to the laboratory and proudly announced the pot, but the body only. Her pride was justified because it was largely through her archaeological propaganda in the village that the object ever reached me. It had been found quite fortuitously by a man digging for 'dirt' with which to put 'tapia' (adobe) on a house then building.... Except for the break at the neck—as I have said, obviously old—the object was remarkably little injured by the entirely fortuitous excavation.

"... It was a Saturday and soon after noon I was able to return. He had found the head, complete with 'head-dress' stopper, which I had not expected. It is shown in the photo. There could be no doubt as to its provenance because it was compacted in situ in the head with original earth-clay. The point has importance because the stopper—though quite in keeping with the genre of the vessel as a whole—is of different paste and inferior workmanship. My guess is that the original stopper has been lost and was replaced by the owner, who probably was not the original potter.... Bones sufficient in quantity and type were found to prove what I had expected, a human burial with mortuary offerings. Although neither any other complete vessels nor 'thunderstones' (so called by the natives when identifying celts) were found, there were found a

peculiarly shaped polished chert pebble, and sherds were found to prove the original existence of at least three entities. The most interesting point concerning these is that they are all of the same hard paste, internally gray after firing with a puce brown exterior, which I showed you as being found but rarely in Trinidad and never—hitherto—complete, and which was invariably ornamented in several colors, one of which was afforded by leaving bare the original pale brown surface. Both the body of the vessel in question and the recovered head showed these characteristics. The stopper does not show them and is altogether of more crude manufacture.

"You will remember that I pointed out that whenever these sherds—of hard gray paste; internally scarcely ever smoothed but always with good curvature; always with carefully puce-brown outer surface which (if any other pigment was used) was also used for contrast—were found, they

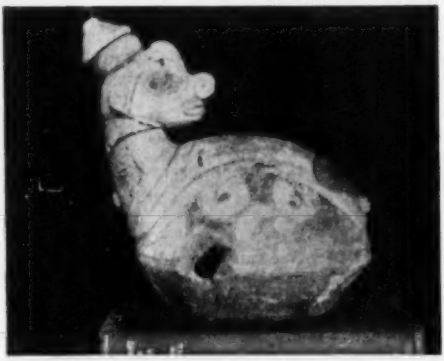

FIG. 37.—Pottery vessel from Trinidad.

were always scattered and we could never reconstruct them. This water pot is unquestionably of such paste, firing, and ornament. So also are the sherds. It is remarkable that while the pot is entire (though with an old fracture) the sherds of unquestionably the same paste, firing, and ornament are so fragmentary and scarce that no vessel can be reconstructed from them. . . ."

Mr. Bullbrook has excavated several sites in Trinidad for his Society and has for some time been developing a laboratory open to all who are interested in the field.

FREDERICK W. SLEIGHT
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STONE CELTS FOUND IN THE VICINITY OF VERNON, TEXAS

Our collection, gathered over a period of years from surface sites in the upper Red River basin of northern Texas, represents only the historic and late prehistoric cultures of this region.

The occurrence of pecked and polished celts in the upper Red River area is of interest since they probably represent prehistoric trade objects carried westward up the Red River from somewhere in the eastern forest area, possibly western Arkansas or extreme eastern Oklahoma. Nine of the celts described here were found along a fifteen-mile stretch of the Red River between the mouths of the Pease River and China Creek, which enter it from the south. Several camp sites are located along the south bank of the Red River between these points and two more lie at the mouth of China Creek. These sites occur on high embankments relatively near the water. Sites are also occasionally found in the vicinity of springs where the terrace recedes from the embankments near the main streams and merges with low, marginal sand hills. Farther up the Red to the northwest two more celts were found, one on the north bank at the mouth of Salt Fork, the other on the south bank at the mouth of Wanderer's Creek.

Indian Hill is a well-known site occupying a terrace approach to a sharp bend in China Creek three miles from the Red River, well above high water on a formation of sandy soil several feet thick overlying a thin seam of limestone. One well polished celt was found on the surface here. Other artifacts were unusual numbers of manos, some circular, some oval, and some wedge-shaped—the latter consisting of two worn, flat faces converging in a sharp edge—a few small projectile points, plain potsherds with shell temper, and one pendant-shaped object of black hematite.

Another site, on the top of a rather high sand hill a quarter mile from the channel of China Creek and a mile from the Red River, produced three celts and parts of two others. Considerable camp debris is evident; flat sandstone manos and shallow "metates" with oval basins were broken and scattered about. Broken shells indicated that mussels were used for food. Four small projectile points, shell-tempered plain potsherds, and two shell beads were also found. Fractured surfaces of the two broken celts show a hard, dark stone, their outer surfaces were roughened by pecking before polishing and are weathered to a light gray shade. All the celts referred to in this paper were probably made from this same material.

The Hicks and Stephens sites are located farther up the Red, on high banks along the south side near the mouth of the Pease River. At the base of an incline below the Hicks site are several gravel pits from which quantities of fossil bones have been removed. The Hicks site itself, on top of the bank, has produced one rounded celt, while another was found in an abandoned gravel pit nearby. A third celt came from the Stephens site a mile farther up the Red River. Each of these celts has a rounded cross section and tapers toward the poll; the largest is 7 inches long. As they are well polished and splendidly formed, they may have had ceremonial significance. Several medium-sized points of chert and small, side-notched triangular projectile points were also found with these celts.

At the Lowery site, across the Red River from the Hicks and Stephens sites, cord-marked pottery appears in some quantity associated with beveled, diamond-shaped knives and small side-notched points. None of our polished celts have been found on sites with cord-marked pottery.

Still farther west, at the confluence of the Red River and Salt Fork, is a site occupying a high, narrow strip of land between the two streams. Besides one celt, three chalcedony points and parts of manos and oval platter-like "metates" were present. No pottery was noted.

The last of our celts came from a site on the south side of the Red River below the mouth of Wanderer's Creek. Two sholudered points of red-banded "Alibates" flint, one pestle-like mano, and part of another were found. Although one grave was opened by a farmer no artifacts were reported.

MR. and MRS. J. HENRY RAY
Vernon, Texas

BOOK REVIEWS

Plant Geography and Culture History in the American Southwest. GEORGE F. CARTER. (Viking Fund Publications in Anthropology, No. 5, New York, 1945. 140 pp., 27 text figures, 6 tables. $1.50.)

Various aspects of the agriculture of the Indians of the Southwest have received attention from time to time and much diverse information on the subject has accumulated. This has remained mostly as isolated raw data with little direct application to the general anthropological problems of the region. Carter has taken the forward step of attempting to correlate these miscellaneous data and to ascertain their bearing on the culture history of the region. In addition to surveying published materials, he spent two field seasons in collecting crop plants and other agricultural data from various Southwestern tribes and in the examination of unpublished materials in various institutions in the area.

Carter examined the distribution through time and space of the crop plants and agricultural practices of the region. He found that crop complexes, irrigation practices, and climates fell into two major areal patterns which he designates the Gila-Sonora and the Anasazi. The main thesis of his paper is that these two agricultural areas had separate and distinct origins and histories. The bulk of the paper deals with the types and varieties of crops typical of the areas and the postulation of histories of crop diffusions which have accounted for the two patterns.

His Gila-Sonora agricultural area, located in the desert, corresponds closely in distribution with the Hohokam-Mogollon archaeological manifestation and with the Piman-Yuman ethnographic area. It is considered to be more virile than the Anasazi pattern and to have far antedated it. In reconstructing the history of the Gila-Sonora area, Carter postulates an origin of agriculture north of and independent of the Middle American centers, somewhere along the coastal area of northwest Mexico. Here the tepary bean, and the local types of *pepo* pumpkin and cotton are presumed to have been domesticated. Corn and lima beans are thought to have been later additions from some more southerly source. The local type of sweet corn may have been differentiated in this Northwest Mexican area. The Hohokam are presumed to have broken away from the main body of their culture (probably Piman) and to have carried this agricultural pattern to the Gila-Salt region sometime before the birth of Christ. Here, about A.D. 500, true irrigation by diversion of flowing streams was developed (but some use of floodwater irrigation was continued) and their rich culture was erected.

The Anasazi agricultural area, located on the plateau, coincides closely with the distribution of the Anasazi archaeological pattern and with the Pueblo ethnographic region. This area is considered to be distinctly marginal and late in American agricultural history, receiving all of its crops from Middle America and having no local domesticates. The major crops were corn of several types, the frijole bean, and the *moschata* pumpkin. Floodwater farming was typical and true irrigation apparently not widely practiced until post-Spanish times. It is argued that the Anasazi crops were definitely distinct from those of the earlier Gila-Sonora area and thus could not have been diffused through the latter area. In order to bring the Anasazi crops from Mexico and around the Gila-Sonora region, Carter postulates that Anasazi agriculture came up the east coast of Mexico, through the eastern United States, across the Plains and into the Anasazi area. As agriculture must have first been practiced among the San Juan Basketmaker by at least about A.D. 200–300, it is necessary that agriculture be functioning in the East before this date. Carter argues for an independent origin of agriculture with local domesticates in the Bluff Dweller country (Arkansas and Kentucky) by about 2000 B.C. and for a flourishing Eastern agriculture with Middle American crops by 700 B.C. To account for varietal changes through time in the Anasazi region Carter assumes that the Eastern corridor functioned for a long period and that at least four waves of diffusion passed through it.

The two Southwestern agricultural areas are conceived of not only as having had distinct origins, but also as having functioned independently throughout most of their histories. Their first interaction is described as at about at A.D. 1000 when the Hohokam-Mogollon culture pushed up the Verde Valley into the region of Flagstaff, Arizona, carrying with it the Gila-Sonora crop complex. These crops are thought to have spread to the Hopi and Zuni country but no farther. About A.D. 1250–1400 a reverse movement carried the Salado culture into the Gila-Salt region, taking with it Anasazi crops which are presumed to have been unsuited to the desert and to have made little impression. So the two areas are assumed to have retained relative purity and essential distinctness to modern times. Modern Pima agriculture is offered as an almost exact replica of Hohokam agriculture, and modern Pueblo agriculture reflects the Anasazi pattern.

This is, in bare outline, the major thesis of Carter's monograph as I understand it. But the style and arrangement of the volume is involved and difficult to follow and I may have misinterpreted his arguments. Data on a particular subject may be scattered through several chapters and must be pieced together to obtain the total picture. The summarizing chapters are sketchy and by no means bring together all of his points. It is readily obvious that his hypotheses are often in sharp contrast to the evidence from accumulated archaeological data against which they must be weighed. To support his unique reconstructions he selects the data which offer support for his arguments, often disregarding conflicting data.[1] It is questionable even that the time has yet arrived to attempt conclusions of the scope which Carter has offered. The very fact that he is able to manipulate the data in such a facile manner is in itself significant, for the paucity of data at some points makes it susceptible to various interpretations. Carter admits (p. 12) that some of his conclusions are tentative and may be revised in the light of new evidence, in which we agree with him heartily.

The chief contribution of the monograph is in setting up

[1] For example, Carter (p. 62) selects supporting ethnological evidence from Castetter and Bell (*Pima and Papago Indian Agriculture*, Inter-Americana Studies I, University of New Mexico Press, Albuquerque, 1942) in attempting to establish that the frijole or kidney bean is post-white contact in the Gila-Sonora area, but he disregards that in the same volume is published a record of this bean archaeologically from the Sacaton Phase at Snaketown (see Castetter & Bell, p. 32). His failure to consider and to dispose of this conflicting evidence casts suspicion on his neat duality of bean types between the areas.

and distinguishing two basic areas in Southwestern agriculture, a contribution for which Carter deserves considerable credit. There can be little question that developments of crop congeries and general agricultural patterns of the two areas have been essentially separate. We can accept that the two areas are as typically distinct in the agricultural complexes as in their general cultural characteristics, and that more or less independent histories are suggested. Serious question will be raised, however, over the contention that totally separate and independent origins are indicated and that the two agricultural patterns existed side by side for almost a thousand years without mutual influence (while other items were being diffused between the areas). A comparison of the earliest crop plants in the two areas is difficult because of the scantiness of data, particularly for the early Hohokam periods. In lieu of such specific data, Carter was forced to resort at times to comparisons of Pima-Papago crops with those of the Basketmakers, an unsatisfactory procedure which weakens his argument.

To argue convincingly for original duality and separate histories of the two areas it is necessary to demonstrate that the original crop plants of the areas were so distinct that they could not but have been of separate derivation. This point is so basic to Carter's reconstructions that if it is not proved, his entire structure collapses As the early Basketmakers had only corn and pumpkins, this entire question hinges on these two crops. Concerning pumpkins, it seems quite clear that *moschata* was the type possessed by the Basketmakers and early Pueblo peoples. It also seems true that an introduction of the *pepo* type into the Anasazi region was made by the Hohokam-Mogollon after A.D. 1000, as this type is found in contact sites of about that date. Concerning Hohokam pumpkins previous to that date, there is no information, however, and the possibility of their having the *moschata* pumpkin cannot be ruled out. In sites of the Salado culture (after A.D. 1250) both types appear. Thus the argument for the duality of origin of pumpkins is weak from lack of sufficient archaeological data on the early Hohokam. Carter expresses regret at the lack of data and admits that the evidence for duality of pumpkin types is "circumstantial," yet this does not prevent him from placing considerable weight on this type of evidence.

There are more abundant data on the early corn of the two areas. In the Gila-Sonora there seems to have been a uniformity of type of corn from the earliest Hohokam corn yet found (Estrella Phase) up to modern Pima-Papago corn. Anderson and Cutler[2] have described this type of corn as the "Pima-Papago race" and say of it:

"To archaeologists this maize is of particular interest because it is very similar to the prehistoric Basketmaker corn which is the oldest recognized type of corn in the Southwest."

In the face of this pronouncement by corn specialists, Carter (after first admitting a general similarity) attempts to differentiate Hohokam and Basketmaker corn as "uniformly flint" and having kernels "red or brown in color" (pp. 44–45). Basketmaker corn of such description does occur in some sites but is not the only kind. I know of no justification for considering this kind earlier than others and Carter offers no reasons for doing so. In the literature listed in Carter's bibliography are papers which describe other types of corn from early Basketmaker sites, for example that from Cave du Pont, Utah, described by Collins.[3] About half of the ears in this large, well-preserved cache were flour corn in type; all but two ears were yellow, and some are dented. This is a pure Basketmaker II site, and is one of the earliest dated sites in the Southwest, with a tree-ring date of A.D. 217.[4] This extremely early corn from Cave du Pont not only diverges from Carter's arbitrary concept of what early Basketmaker corn should be, but also includes types of corn which he (p. 51) considered to have been absent from the Anasazi region until Pueblo I and later times, and which constitute his third and fourth diffusions of corn from the East! Until we can be sure as to the type of the earliest Anasazi corn there seems to be no justification for saying that it could not have been of the same derivation as Gila-Sonora corn. In a later paper with Anderson, Carter appears to have made a strategic retreat from his early position, for in speaking of Hohokam and Basketmaker maize they say:

"We have therefore a distinct race of corn in the Southwest that is common to the two different cultural areas at the earliest levels. . . ."[5]

Further, in this later paper Carter and Anderson neatly sidestep the entire question of how corn reached the Basketmakers, and, while making some intimations, do not commit themselves completely to bringing any corn into the Pueblo region via the East before A.D. 1200.

If Carter has not proved the distinctness and duality of origin of Hohokam and Basketmaker agriculture his entire structure of crop chronology and corridors for the Anasazi area breaks down. It becomes unnecessary to detour Basketmaker and early Pueblo crops around the Gila region and through the East. There is then no need for arguing for an agriculture in the East antedating that of the Basketmakers. If it becomes unnecessary to derive Basketmaker agriculture from the East the problem becomes much simplified. No serious obstacles prevent bringing later waves of agriculture into the Pueblo area from the East after, say, A.D. 900 even without revision of accepted chronologies. If Carter's basic point of original duality is discarded we have essentially the picture as recently expressed by Haury[6] with which most archaeologists would agree, viz., that corn agriculture reached the Gila region from northwestern Mexico by the beginning of the Christian era and was transmitted from there to the Basketmakers of the San Juan slightly later, and that later additions of corn may have been made in Pueblo times, bypassing the Gila region.

The major part of the volume is given to summarizing the archaeological and ethnological data on the plants involved in Southwestern agriculture and reconstructing the histories of the plants. The discussions of the different crop plants are valuable and interesting, and for some of the plants they are the most complete statements available. Carter has apparently surveyed a great amount of litera-

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[2] Edgar Anderson, and H. C. Cutler, "Races of Zea mays: I. Their Recognition and Classification." *Annals Missouri Botanical Garden*, 29, 1942, pp. 69–88. See p. 84.

[3] J. L. Nusbaum, *A Basket-Maker Cave in Kane County, Utah*. Museum of the American Indian, Indian Notes and Monographs, 29, 1922. See pp. 67–69 and Plate 35.

[4] W. S. Stallings, Jr., "A Basketmaker II Date from Cave du Pont, Utah." *Tree Ring Bulletin*, Vol. 8, No. 1, July 1941.

[5] G. F. Carter, and Edgar Anderson, "A Preliminary Survey of Maize in the Southwestern United States." *Annals Missouri Botanical Garden*, 32, pp. 297–322, 1945. See p. 315. Dr. Anderson generously furnished me a copy of the page proof prior to the release of this article.

[6] E. W. Haury, "The Problem of Contacts Between the Southwestern United States and Mexico." *Southwestern Journal of Anthropology*, Vol. 1, No. 1, pp. 55–74, 1945. See pp. 66–67.

ture and has examined considerable amounts of crop materials on which to base his discussions and interpretations. Unfortunately, however, he chose to present this in summary form without close documentation. The scantiness of documentation in most of the chapters makes it impossible for the reader to check the paper against the source material at most points. Further, it is not possible to check his discussions of types of plant materials against previous descriptions or against collections, as his types and classifications are inadequately characterized. He sets up classes and types of corn, beans, and other crops but the reader is always at a loss to know precisely what these are and how they compare with materials described in other publications and with those in collections.

Carter is particularly vague concerning his own collections. He states (p. 11) that he has made extensive collections of crop plants, and apparently his discussions are based in a large measure on his own collections. But these are never described in any detail and their origins, nature, and extent are never divulged. They are kept in the background to be drawn upon as needed for generalizations and are never brought into full view. The reader is, therefore, at a disadvantage in not knowing the precise nature or extent of the materials on which conclusions are based. The collections and source material which Carter compiled and had at hand would be of considerable interest and value if put on record in more detail and would have given more visible substance on which to base his interpretations. He has, in effect, published his conclusions before he has presented in verifiable form the data on which they are based and thus his conclusions must be treated with some reserve until a greater amount of substantial data is marshalled to support them. It is sincerely hoped that Carter will publish his more detailed and documented notes, otherwise the bulk of his data will not be available and others will have to go over the same ground.

Perhaps the most serious criticism of Carter's paper is that he has not separated the factual data from his interpretation and speculation. Throughout the paper, objective data are mixed almost inextricably with interpretation, impressions, speculations, and hypotheses. The reader is led through a maze of involved argument and cannot be sure at any time just how firm the footing may be. The usefulness and value of the paper would have been greatly enhanced if the objective data had first been presented and the interpretations reserved for a separate section. This criticism applies particularly to a paper in which the conclusions are so much at variance with accepted opinion.

Carter accepts the principle of multiple origins for American agriculture suggested earlier by Sauer,[7] and invokes two independent areas of the development of agriculture north of Middle America in his interpretations. He remarks that Sauer has presented the *evidence* for plural origins of American agriculture, and apparently considers the matter closed. Actually what Sauer presented was speculation rather than evidence and the case is very much open. There is no question that there are a number of areas of crop differentiation in America and that, in several of these, distinct crops were brought into cultivation. The question remains unsettled as to whether these were separate areas of origins of agriculture or whether they are areas into which agriculture from a common center has diffused and in which additions of local crops have been made to the pattern. The idea of multiple origins is a fertile one and should be of value in solving some of the existing problems, but it still remains to be demonstrated that a pre-maize agriculture existed anywhere in America. Carter's northwest Mexican center of origin must be considered as no more than an interesting hypothesis worthy of investigation until more substantial evidence has been mustered to support it. There are a number of tantalizing suggestions of pre-maize, pre-pottery levels in the Eastern bluff shelter area. There is as yet, however, no clear-cut stratigraphic evidence in this area to establish the sequence of crop plants or to establish agriculture previous to the occurrence of pottery. Carter's statement (p. 28) that a widespread, well developed agriculture in the Southeast prior to the appearance of Middle American plants "is thus well established" is pretty strongly worded and far oversteps archaeological evidence.

Carter falls in with Ames[8] in chiding the archaeologists for seeming to overlook what seems to him the obvious fact that the amount of time needed for the development of agriculture is not allowed in accepted archaeological schemes of chronology. Such discussion is apparently based on the erroneous assumption that archaeologists deny any agriculture in America prior to about the beginning of the Christian era. Archaeologists have remained rather steadfast in what may seem a conservative attitude in not dating any of the known agricultural levels before that time. But these levels such as El Arbolillo, Copilco, Chimu, and Nazca all admittedly have well developed agriculture and pottery. No archaeologist suggests that these represent the earliest beginnings of agriculture. Before them must have lain a long period of plant experimentation and a gradual development of agriculture. If man first reached this hemisphere at about the close of the Pleistocene, it would seem that a sufficiently long period is available for this development, regardless of which current estimate of the number of thousands of years one chooses to accept. Wherever these early beginnings of agriculture may have been, they have not been discovered, or possibly have not been recognized. Any such evidence would be most welcome to archaeologists and they would, I predict, be only too glad to extend their time scale appropriately.

In a few places Carter has been led into error by following his sources uncritically. A notable example is his postulation of a diffusion of the lima bean up the east coast of Mexico to account for "the area of lima bean growing that existed in the eastern United States" (p. 78). Here he follows his source (Mackie) who implies that archaeological lima beans have been found near Pine Bluff, Arkansas. Actually lima beans have not been found archaeologically east of the Rocky Mountains and there is no clear evidence for their aboriginal cultivation in the East. This incident, however, serves to demonstrate Carter's readiness to postulate a diffusion of a plant at any time to serve his argument.

The value of synthesizing and interpretive papers such as the one under review is usually not so much in arriving at substantial conclusions or final solutions as in suggesting problems and lines of future research. Regardless of the extent to which future studies bear out or disprove Carter's conclusions, he has called attention to many facets of the history of Southwestern agriculture which are in need of investigation. The method of crop geography has great po-

[7] Carl Sauer, "American Agricultural Origins: a Consideration of Nature and Culture." *Essays in Anthropology Presented to A. L. Kroeber*, University of California Press, Berkeley, 1936, pp. 279–297.

[8] Oakes Ames, *Economic Annuals and Human Cultures*. Botanical Museum of Harvard University, Cambridge, 1939. See pp. 140–143 particularly.

tential value to archaeology, though Carter's somewhat incautious application may prejudice the method itself in the minds of some. Nevertheless, it should be borne in mind that he has worked in a relatively untried field where data are of uneven value and sometimes scant or lacking. He has boldly offered his conclusions as he saw them, without being circumscribed by a too conservative attention to ideas arrived at by other approaches. The results are sometimes startling but always stimulating and provocative, and should do much to encourage additional studies.

VOLNEY H. JONES
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CARTER'S THESIS IN THE LIGHT OF ARCHAEOLOGY: THE SOUTHEAST

To the student of Southeastern archaeology, Carter's most revolutionary hypotheses are: (1) that maize agriculture was established in the Mississippi Valley by 700 B.C. or earlier, and (2) that the maize-beans-*moschata* complex, forming the agricultural basis of Southwestern Basketmaker culture as of A.D. 300, entered the Southwest from the Southeast. Carter's other findings on eastern United States horticulture, such as the old pre-maize domesticate complex including a local variety of *Cucurbita pepo*, are of interest, but are in line with present speculations in Eastern prehistory. It is the shattering announcement of a pre-Christian era dating for Middle American domesticated food plants in the Southeast, and the movement of these agricultural plants and concepts from east to west at a very early date, that does not fit the picture of Southeastern cultural development held by archaeologists.

In considering Carter's thesis, what, then, are the principal points of conflict with archaeological evidence and archaeological interpretations in the eastern United States? Are the two sets of evidence and opinion (plant geography, as expressed by Carter, and archaeology) irreconcilable? To answer this, it is necessary to define "conventional archaeological opinion" on Southeastern and Eastern prehistory. The reviewer ventures upon this with full knowledge of the many differences of opinion that exist among archaeologists working in these areas. Overall interpretive studies of Eastern prehistory are only beginning to appear, and disagreement, naturally, waxes great. As one of those who has hazarded a sweeping reconstruction of Eastern cultural sequences, correlations, and diffusions, the reviewer in no way means to imply that there is a general acceptance of all phases of his particular interpretation as expressed in 1941.[9] He has, in fact, changed his own opinion on several points since that time. Nevertheless, as work in the East has progressed, certain outlines have emerged on which there is a virtual unanimity of understanding, or, to put it another way, Eastern archaeologists can now be said to be operating within "boundaries" of opinion. Just as in the Southwest the fundamental cleavage of Hohokam versus Anasazi is universally appreciated, there are, in the Southeast, equally agreed upon concepts.

For example, there is considerable agreement that within the eastern United States there existed an "Archaic" or "Early Hunter" horizon which had no ceramics, large ceremonial structures, or elaborate burial customs. Similarly, the era of the building of large mortuary mounds, with the associated artifacts and types of pottery, is known to have followed the Archaic horizon in time throughout most of the East. Hopewell, Adena, Copena, Marksville, Tchefuncte, and Weeden Island are all cultural manifestations belonging to this "middle" time zone of the East. It is further agreed that in the northern part of the East there is the center, or there are centers, for the Woodland culture type even though the nature of relationships between Woodland and the Burial Mound cultures of the Mississippi and Ohio valleys is the source of a good deal of dispute. Later than the Burial Mound horizon is the final major Eastern period, the Mississippian or Temple Mound, characterized by certain community arrangements and structures, artifacts, and ceramics. While there is considerable debate over the origin and direction of diffusion of many of the Burial Mound traits, there is general agreement that the crystallizing factors of Mississippian culture were derived from Middle America and that the general direction of the spread of the Temple mound complex was from south to north. As to estimated dating, there are, again, outside limits within which Eastern archaeologists have been operating. No one has ventured to guess the beginning date for the Eastern Archaic, but working at the other end of the sequence, majority opinion would not put the beginnings of Mississippian culture back of A.D. 1200, and almost no one would estimate them as pre-1000. On the Burial Mound horizon there is probably less agreement, but estimated dates for its inception would probably range from A.D. 1000 to 500, or, perhaps, even earlier. The reviewer doubts, though, if anyone would go back of A.D. 1.

As to the archaeologist's evidence and opinions on agriculture in the East, we can state the following: From Mississippian and contemporary cultures examples of maize, beans, and squash have been recovered frequently. On the Burial Mound level, this type of evidence is less plentiful, but the Adena people of Kentucky were known to have had corn, and, on the western limit of Burial Mound distribution, in the Hopewellian manifestations near Kansas City, maize and beans occur. It is, however, generally believed that corn was domesticated and widely used by native populations of the general Hopewell, Marksville, Tchefuncte, Adena, etc. time period. As to the Archaic, although evidence of a non-maize horticulture is suggested in some localities, it is fair to say that few students consider this early horizon to have been a maize agricultural one.

Carter's thesis, in view of all this, is clearly at variance with Eastern archaeology. We are faced with the dilemma, neither horn of which is looked upon with favor by archaeologists, of pushing the beginnings of the Burial Mound stage back to the neighborhood of 700 B.C., or of supposing the introduction of the maize complex to have occurred in the Archaic stage. If we take the first choice, we are forced to draw out either the period during which Tchefuncte developed into Marksville, or that in which Adena was transformed into Hopewell, over a period of 1200 to 1700 years (from 700 B.C. to A.D. 500 or 1000). Or, if we take the alternative explanation, we are asked to accept the introduction of maize, beans, and *moschata* into the Archaic level, into a cultural background in which there was already a tradition of plant domestication with local crops, and following which there can have been virtually no cultural change within this Archaic stage over the period from 700 B.C. to A.D. 500, or later. The first explanation demands an unbelievable condition of cultural stasis for the Burial Mound period. The second explanation would mean that agriculture did not serve as a cultural dynamic to the people of the Archaic period. Neither explanation is in accord with what we know

[9] Ford and Willey, "An Interpretation of the Prehistory of the Eastern United States," *American Anthropologist*, Vol. 43, No. 3, 1941, pp. 325–363.

of culture change under similar conditions on the American late pre-agricultural and early agricultural levels. In two other American areas where there is a clear record of the shift from a pre-agricultural to an agricultural economy, the southwestern United States and the north coast of Chile, the advent of domesticated food plants, including corn and beans, has been paralleled by radical changes in human material culture, apparently reflective of the new economic adjustments. No such cultural change is noted within the long time span of the Eastern Archaic. And on the other score, nowhere in the New World is there a record of an early maize horticultural society which maintained a stable unity of type and pattern comparable to that of the Burial Mound cultures and pattern for a period of 1000 to 1500 years. Certainly, all precedent is against ascribing such a duration to the Burial Mound horizon. The conflict of views is a basic one, and until proof is more convincing I do not believe that archaeologists will concede the introduction of domesticated plants from south of the Rio Grande at a time before the birth of Christ.

In contemplating the postulated spread of the maize, bean, and *moschata* complex from the East across the Plains into the Southwest, we are faced with this same difficulty of dating. There have, as yet, been no early (A.D. 300) archaeological cultures discovered in the intervening southern Plains area that could be considered as horticultural and that could have served as the proper base on which this relatively slow diffusion of food plants could have taken place. That there may be, is a possibility, but the probabilities are against it.

The reviewer is not arguing that a thing which has been stated many times (conventional archaeological opinion, or "dogma," if you will) is necessarily truer or closer to the facts than a new idea which cuts against the grain of the old. He realizes that the findings of plant geography and plant genetics will be crucial to the solution of historical problems in New World cultures. But, for the moment, the discrepancies between Carter's theories and those of the archaeologist seem overwhelming; in view of this, he feels that the data and the methods of the student of culture, gross and inexact as these may be, cannot yet be relegated to a secondary position in the face of a new line of evidence from another discipline. Perhaps a penetrating analysis of all archaeo-botanical collections available in the museums of the eastern United States might modify the revolutionary views advanced by Carter.

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CARTER'S THESIS IN THE LIGHT OF ARCHAEOLOGY: THE SOUTHWEST

There is definite challenge to many current archaeological concepts in Dr. Carter's presentation of botanical facts and theories and his interpretation of their import in American aboriginal history. His conclusion that the Anasazi province of the Southwest was a peripheral laggard deriving all of its agriculture from older cultures in the eastern United States will probably shock many students in both areas. The Basketmakers have so long been regarded as antedating most and having contemporaneity with others of the older groups in the Southeast that it is difficult to conceive of their being, as he believes, 1,000 years behind the times in taking over the growing of corn and pumpkins, the latter presumably having been obtained from peoples in the Mississippi Valley to whom he assigns agricultural beginnings, on the Central American plant assemblage level, some 1,400 years earlier than is now postulated by archaeologists working in the area. This is only one phase in the general problem, but it is one which immediately catches the attention of the workers in both fields. From the material presented, it would appear that the bulk of Carter's thesis must stand or fall on the correctness of his botanical identifications and deductions. Archaeological evidence plays only a secondary role and often is skimpy indeed. The latter situation is attributable in the main to the failure of earlier investigators to save the necessary specimens or to the fact that in many sites organic materials are no longer preserved. However, it does not appear that as much weight is given to archaeological data, in many cases, as they merit and it seems that more attention might have been paid to the archaeological complex as a whole. Traits lifted out of their complete assemblage sometimes suggest different things from those traits considered in the full body of the materials from a site.

Carter's conclusion that the Southwest was divided into two distinct groups characterized by crops differing in species or varieties—a division apparently going far back in time and correlating with the geographical areas of the lower Colorado and Gila drainage systems, occupied by Patayan-Hohokam and Yuman-Piman peoples, and the Plateau, with its Anasazi-Recent Pueblo and neighboring tribes—meets no objection from the archaeological point of view. Moreover, it is interesting to note that agriculturally he finds there was as marked a difference as in other elements of the material culture and that it was only in comparatively recent times, when the diffusion and exchange of other traits was taking place, that there was some overlapping and mixture in the crop assemblages. Evidence for the basic crops in the early stages of the Hohokam is so meager, however, that his interpretation of the lack as negative in some cases and merely as a lack in others, according to which best fits his thesis, is open to question. As a matter of fact this tendency appears throughout the paper.

In connection with the agricultural dichotomy, Carter postulates two sources of origin in Mexico and two routes of diffusion, one along the westward side, to the Hohokam, and the other along the eastern, reaching the Anasazi by way of the Gulf Coast, Mississippi Valley, and back across the Great Plains. Archaeologically the preponderance of evidence, although it has not been definitely established thus far, is for a broad basic culture in northern Mexico which was ancestral to both Hohokam and Mogollon and from which both apparently received their corn, presumably other agricultural items, and pottery. Some believe that the diffusion may have been through the Hohokam to the Mogollon, but it is quite possible that it was direct in each case. At present there is no evidence of peoples sufficiently ancient to have transmitted this complex northward through Sinaloa and Sonora,[10] across Chihuahua,[11] or for that matter along the Gulf Coast on the eastern side.[12] Late horizons in all three areas show contacts north and south and it is presumed that similar conditions prevailed

[10] G. F. Ekholm, *Excavations at Guasave, Sinaloa, Mexico*. Anthropological Papers, American Museum of Natural History, Vol. 38, Pt. 2.

[11] D. D. Brand, "The Distribution of Pottery Types in Northwest Mexico." *American Anthropologist*, Vol. 37, No. 2, Pt. 1, pp. 287-305. E. B. Sayles, *An Archaeological Survey of Chihuahua, Mexico*. The Medallion Papers, no. 22.

[12] J. A. Mason, "The Place of Texas in Pre-Columbian Relationships between the United States and Mexico." *Bulletin of the Texas Archeological and Paleontological Society*, vol. 7, pp. 29-46.

in ancient times, but that they did is not actually known, and to choose one route in preference to another because of lack of evidence in the one less desired appears to be forcing the issue. In the light of present knowledge it is plausible to assume that influences working northward may well have penetrated the Southwest along the Sierra Madre through the Cochise culture of southeastern Arizona and southwestern New Mexico. This would serve as Carter's western route although the one he primarily had in mind was along the coast and through the lower country farther west. There is not as much basis for question in this respect, however, as in that of the eastern route. It is the latter that is of particular interest because of its implications. Unfortunately, so little is known about the agriculture of the Mogollon, located in a key position on the southeastern and eastern peripheries of the Anasazi and the Hohokam, that there is no evidence of what effect, if any, it may have had on the adjacent cultures. On the strength of indications of other relationships between the Mogollon and Hohokam, Carter concludes that their agriculture was similar and that the Mogollon did not transmit the Central American plant complex to the Anasazi. Until it is established definitely that Anasazi corn and pumpkins were not present in southwestern New Mexico, it seems more logical to suppose that they reached the Plateau by that route than by a route swinging eastward to miss the Mogollon. From Modified or Basketmaker III and early Mogollon times, increasing as the cultures developed, there is evidence for contact between the two, and traits either passed back and forth or were common to both. In later pre-Columbian periods and early historic times there was considerable movement north and south between Mexico and the eastern Pueblo area along the eastern slopes of the Sierra Madre, especially by way of the Conchos and Rio Grande, and the route probably was well known for a long time. As previously mentioned, absence of evidence for early horizons in eastern Chihuahua and up the Rio Grande does not necessarily rule that region out of consideration as there is a comparable situation in the coastal plain. Despite the fact that the status and age of the so-called Coahuila and Big Bend Basketmakers are still to be determined, their potentialities suggest that conclusions should be held in abeyance until more is known about them. It is true that in some cases, as Carter points out, there is no evidence for agriculture among these people and in others, indications are for a Hohokam type, but the material is so meager that it raises a question as to whether or not it is truly representative.

The matter of diffusing the Central American plants along the Gulf Coast to the Mississippi Valley involves jumping a gap comparable to that in a route along the eastern slopes of the Sierra Madre, and brings another feature into the picture, one which calls for considerable credulity. In order to provide a source for the plants transmitted westward, the author does not hesitate to postulate a culture for which there is no evidence (pp. 35–36). He would derive the corn and pumpkins—beans were a later addition which he suggests were delayed in adoption because of their need for greater care in cultivation and the lack of pots in which to cook them—from a stage intervening between the Stern's Creek type of culture as found in eastern Nebraska and that of the Ozark Bluff Dwellers. Stern's Creek, apparently having no corn, was too early and the Bluff Dwellers, having several kinds, were too late. It is doubtful that many archaeologists would agree with Carter in his assumption that the Stern's Creek remains are older than the Bluff Dwellers, even less, that they were sufficiently antecedent to permit an intervening culture. The Stern's Creek culture, as far as is known, is restricted in range and somewhat anomalous in that its chief distinguishing feature is the pottery. That it could be identified solely from its other artifacts is questionable. Furthermore, until sampling comparable to that done in other sites of the general area has established that the lack of corn and beans is actually a negative trait, its use as evidence for a pre-Central American agricultural level seems a bit forced. Before they can take their proper place in the archaeological picture some of the Stern's Creek sites must be worked from the surface downward, level by level, and not dug into, a little here and a little there, along the gully bank.

If Carter is correct in his conclusion that corn and pumpkins spread westward across the southern Plains, certain remains in the Panhandle of Texas and Oklahoma take on considerable significance and it is possible that the slabhouse sites found there, but hitherto regarded by most archaeologists as peripheral and laggard to the Anasazi, may be attributable to descendants of the group which transmitted those plants to the Basketmakers.[13] As a matter of fact, Moorehead long held the opinion that the origin of the Pueblo cultures should be looked for in the western Plains. The caves along the Cimarron Valley[14] may represent an earlier phase in the sequence and be even more important in that connection. On this supposition, it may be suggested that the diffusion was westward along the Arkansas and Canadian rivers and their tributaries. Such a movement would account for the seemingly early horizons in the San Luis Valley of Colorado and indications that some cultural traits passed southward through that corridor to the eastern part of the Anasazi area, also, for eastern influences spreading westward by way of the Gallina and over the divide to the Governador, Largo, and other tributaries of the San Juan. From present knowledge, the latter route appears to have been the more important of the two. The earliest remains yet known in that district are not as old as those farther west, however, and it will be necessary to find evidence of a considerably earlier occupation in order to explain how crops passed from east of the Rio Grande to the Four Corners area. From east to west, the dendrochronological dates become progressively older. There are some indications of eastern influence beginning at about A.D. 700,[15] and, by about 1000, eastern traits began to make a definite imprint in the Gallina-Governador and adjacent precincts. It was at about this same period that new agricultural influences began to appear along the Rio Grande. These apparently did not continue on to the San Juan and Little Colorado districts, however, and helped to make the distinction which Carter finds between the crop assemblages of the Pueblos along the Rio Grande and those of the Zuñi and Hopi. Prior to late Pueblo II there is little to indicate an infiltration of eastern traits to the Plateau proper and even then the evidence is meager. Archaeologically the picture is still that of major developments taking place in the San Juan-Little Colorado provinces and spreading

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[13] W. K. Moorehead, *Archaeology of the Arkansas River Valley*. Department of Archaeology, Phillips Academy, Andover.

[14] J. B. Thoburn, "The Prehistoric Cultures of Oklahoma," in Moorehead, *Archaeology of the Arkansas River Valley*, pp. 51–82. E. B. Renaud, *Prehistoric Cultures of the Cimarron Valley, Northeastern New Mexico and Western Oklahoma*. Colorado Scientific Society Proceedings, Vol. 12, No. 5. Carter makes reference to this paper.

[15] E. T. Hall, Jr., *Early Stockaded Settlements in the Governador, New Mexico*. Columbia University Press.

eastward where they came in contact with westward moving influences from the Plains.

In his discussion of the diffusion and exchange of traits between the Hohokam and the Anasazi, Carter emphasizes the part played by the Verde Valley and the fact that much of the Hohokam contribution must have passed up that corridor to the Flagstaff area and thence to the Hopi and Zuñi and other portions of the Plateau. This probably was true in the west, but, for the eastern districts, another route of diffusion no doubt was equally important. In the Chaco Canyon there is evidence for long-continued relations with the Upper Gila and San Francisco River villages and many of the so-called Mogollon traits in the Chaco undoubtedly derived from that source. Indications of contact with the west are not so marked, and peripheral Chaco communities along the Arizona border were laggards, and dendrochronologically later than the main centers of that cultural pattern. Hence, it seems likely that Hohokam-Mogollon agricultural influences were carried to the Chaco from the south rather than from the Little Colorado proper. Zuñi would be on the direct route of such a diffusion and this would in part help to explain differences between the Hopi and Zuñi crop assemblages which otherwise are somewhat puzzling. Although mention is made of the Anasazi penetration of the Hohokam area at A.D. 1300–1350 and the subsequent withdrawal, A.D. 1400–1450, it does not seem that sufficient consideration was given to the possibility of many southern items, particularly in the Zuñi district, being brought back at that time, rather than at an earlier date.

On the basis of present crop assemblages, Carter points out that the agriculture of the Basketmakers, while it no longer exists, may be regarded as surviving in conjunction with that of later Kayenta and San Juan cultural levels in the agriculture of the Hopi and Zuñi. From the preservation of traces of the ancient crops, he suggests that the Hopi may well be the nearest direct descendants of the Basketmakers and that the Zuñi should represent the earliest Puebloan peoples, those from whom the Basketmaker II learned agriculture (p. 121). This is based on his interpretation of the botanical evidence. In view of the facts that the Basketmakers had agriculture long before the advent of the Pueblo phase of the Anasazi, that Basketmaker III intervenes, and that all evidence is for the Pueblos having derived their agriculture and many other traits from the Basketmakers, such a conclusion is not tenable. However, that there is some merit in the basic idea is indicated in the results of an independent study of the Zuñi. Seltzer found that the Old Zuñis (Hawikuh) were of the Basketmaker physical type, that they had virtual identity with Hooton's Pecos "Basketmakers" but somewhat less similarity with the Arizona Basketmakers.[16] The common relationship is such that all are believed to have constituted a general "Southwest Plateau" stock. The status of the Hopi is not given, but remains from sites that probably are old Hopi indicate that they also were of that stock. Evidence is not available as to which branch they represent, yet in view of their location it may be supposed that their affiliations are with the Arizona Basketmakers. This suggests that extending far back there were eastern and western divisions of the Basketmakers, a situation also indicated in some of the cultural material and borne out by the linguistic differences between the Hopi and Zuñi. The Hopi speak a Shoshonean dialect, while the Zuñi are generally considered as a distinct linguistic family. Some, however, believe the Zuñi have linguistic affiliations with the Tanoan and Kiowa, again pointing eastward. Considering these factors, it is possible that the ancestral Zuñi transmitted basic agriculture to the ancestral Hopi if the plants came in from the east, but it was on a Basketmaker cultural level and not Pueblo to Basketmaker. On the other hand, the diffusion still might have been through the ancestral Zuñi, but from the south.

Carter places considerable emphasis on the matter of irrigation and the fact that the Hohokam developed great canals to carry the water for their fields, while the Anasazi made little use of such an adjunct to their agriculture. This feature is important in the matter of cultural differences, yet does not seem to be as significant as the author indicates. He apparently minimizes the fact that many of the Hohokam, in locations away from the rivers, relied on floodwater irrigation and that actually there was more use of ditches among the Anasazi than he suggests. That the Basketmaker III or subsequent Pueblos in the San Juan-Little Colorado areas did not more fully adopt this trait is not so much attributable to their being cultural dullards or lacking knowledge of what their neighbors to the south were doing as it is to the nature of their environment. It is extremely doubtful that groups of the Hohokam, if transplanted to the Hopi country, the Chaco Canyon, Montezuma Valley in Colorado, the Mesa Verde, or Alkali Ridge in southeastern Utah, would have done much more in attempting to water their crops than the Anasazi did. In most cases there were no permanent streams to tap and, in the few instances where there were, most of the channels were so deep that to divert water to reach the fields was out of the question. Where it was feasible it seems to have been done.

One factor disturbing to the archaeologist is the way in which the author adheres to the general concept of time where dendrochronological dates or dating by materials which can be correlated with them are involved and then, when such evidence is not available, postulates greatly expanded periods and long stages of development. Having erred through that practice themselves, archaeologists are prone to be somewhat conservative in their estimates. Yet on the strength of all the other evidence, it would appear that Carter is demanding too great antiquity in some respects. It probably is true that the domestication of plants and their adaptation to different localities took a long time, but it is possible that the botanists are asking for more than is necessary. When approximately accurate dating indicates one thing, it seems rather presumptuous to insist upon another. Actually, much of the development may have taken place before the plants moved northward out of Mexico. Other items that raise doubts in the mind of the reader are the kinds of evidence used, the interpretations made, and the citations given. It frequently is not made clear whether the material was that gathered by the author, whether the identifications were made from descriptions in reports, or whether specimens collected by others were studied. In some cases, reference is made to a report which does not mention the plant concerned and one must assume that the information came from study of the material in a museum. Checking on other features shows that occasionally one plant in an assemblage has been mentioned and another, which was present and equally important in the complex, was not. A single grain of sweet corn from Jemez Cave is cited as

[16] C. C. Seltzer, *Racial Prehistory in the Southwest and the Hawikuh Zuñis*. Papers of the Peabody Museum of American Archaeology and Ethnology, Vol. 23, No. 1.

evidence for the plant in that district at A.D. 1250 to 1300 (pp. 53–54). No consideration seems to have been given to statements in the report on the cave to the effect that it had been used as a resting place by recent Jemez Indians who spent the night there, feasting on deer and corn, or that there was considerable disturbance due to pothunters, or that there were numerous rodent holes containing paper, string, machine-made cloth, and grains of wheat, running all through the deposits.[12] In addition, this cave is cited as showing that the *pepo* pumpkin was grown in the area in Pueblo III times (Table 1, p. 21), while the report on the cave (p. 64) says that all of the identifiable material was *moschata*. With such in mind, there is question as to how carefully other archaeological evidence has been handled.

At first reading, *Plant Geography and Culture History in the American Southwest* seems extremely plausible. The deeper one digs into it, however, the harder it becomes to pin things down and accept deductions and conclusions. The average archaeologist, no doubt, will be bothered by unfamiliar botanical terminology and concept. No worker in the Southwest or Southeast should pass it up on that score. It points up many problems and is not something that can or should be brushed off. Whether correct in all of its implications or not, Carter's paper is a definite contribution. The marked discrepancy between conclusions reached by the archaeological and botanical approaches to cultural history indicates the necessity for some good sound thinking and a careful review and checking of evidence, not to mention additional research, in both fields of investigation.

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Mainsprings of Civilization. ELLSWORTH HUNTINGTON. (xii +660 pp., 83 figs., 26 tbls., bibliog., index. $4.75. New York, N. Y., John Wiley and Sons, Inc., 1945.)

Mainsprings of Civilization is, in a way, a résumé of Ellsworth Huntington's entire life work. Its antecedents are twenty-seven books and numerous articles, and it incorporates additional data and ideas from an amazingly wide range of sources.

It is the purpose of the book to evaluate the place of biological inheritance and physical environment in shaping human history. Part I deals with the evolutionary process: physical, biological, cultural, and spiritual. Part II is concerned with heredity, and Part III with physical environment. Significant of emphasis is the allotment of 36 pages to Part I, 189 pages to Part II, and 388 pages to Part III. Culture is granted a place with heredity and environment; its detailed treatment is reserved for a projected work which will interpret the main trends of history in terms of the three aforementioned factors. Mr. Huntington points out that written history is most largely concerned with cultural matters, to the neglect of the inheritance and environment upon which they are dependent.

In Part I the basic evolutionary urge, both organic and inorganic, is seen as the supreme fact of history. Human culture and civilization follow a general line of progress, directed by deep-seated, dimly understood forces. Historical incidents, individuals, cultural blind alleys, temporary stagnation are at most mere ripples that roughen the tide of inevitable advancement. Granted a permissive environment, man will everywhere eventually raise cereals, domesticate animals, build roads, construct houses, and develop metallurgy and writing—without significant help from diffusion.

The unique earth provides an environment fit for civilization. On it man is the product of the progressive evolution toward civilization that has accompanied great changes in natural environment. Human culture has come to supplement physical and chemical evolutionary factors. Urban and industrial life and ability to control birth seem to have altered the selective forces which determine what types of people shall survive.

In Part II, devoted to consideration of the place of heredity, Mr. Huntington takes a position between the racialists and those who deny that "mental traits are ever inherited biologically." He agrees largely with Hankins that eugenic contentions are sound, that there are stocks within races who have superior hereditary endowment. The superior hereditary endowment of these groups plus environment provide the materials and conditions for the growth of human culture. Both physical environment and heredity are modified by cultural advances, ultimately giving rise to civilization.

The traditional race classifications are regarded as being quite unsatisfactory, but there is found in Sheldon's endomorphs, mesomorphs, and ectomorphs an approach toward a meaningful physical classification of humankind. Here there is presumably a marked association of different temperaments with combinations of physical traits such as stature, weight, and nature of the alimentary tract.

The hypothesis is advanced that natural selection accompanying migration together with environmental factors may cause the people of specific regions to show a dominance of certain body types and corresponding temperaments. Thus there arise uniform stocks or "kiths" within races. Examples of kiths are Icelanders, Newfoundlanders, Puritans, Jews, Junkers, Quakers, Parsis, Hakkas, and Mongols. The notable advancement of Icelanders over Newfoundlanders is attributed to the higher innate intellectual capacity of the former, in spite of the fact that the two kiths are racially similar and operate within somewhat similar and stringent natural environments. Puritans are shown to be a highly selected kith who have provided far more than their share of leaders. Even more rigorously selected are the Junkers, Jews, and Armenians. The aforementioned Newfoundlanders make the point that a kith does not necessarily possess better-than-average endowment.

In the treatment of physical environment in Part III, Mr. Huntington gets back to the familiar ground of his well-known earlier works.

There is a map of civilization based on evidence ranging from the opinion of a selected jury to figures on the efficiency of factory workers. There is the correlation of the advanced areas with the optimum mean daily temperature of 65 degrees F. and the stimuli of seasonal variation and frequent cyclonic storms. The conclusion follows that northeastern United States, adjacent Canada, and northwestern Europe share the climatic supremacy of the world so far as the present stage of cililization is concerned. For earlier and less advanced stages of civilization, other areas, e.g., Greece and Egypt, possess optimum conditions.

Another section points out the great importance of diet in determining the level of efficiency; how the departure from the varied and nutritious diet of pre-agricultural prim-

[12] H. G. Alexander and P. Reiter, *Report on the Excavation of Jemez Cave, New Mexico.* A Monograph of the University of New Mexico and the School of American Research.

itives has frequently led to the dominance of a single agricultural crop, with consequent depression of mental and physical vigor. A listing reveals the English-speaking countries as the best fed.

Yet another section of several chapters is devoted to the subject of cycles of varied periodicity, with their significant bearing on the evolution and present condition of civilization. Mr. Huntington considers a variety of cycles, from many-year climatic cycles to shorter biologic and business or economic cycles. Each can be referred basically to atmospheric conditions: rainfall, temperature, ozone content, and atmospheric electricity. Favorable phases stimulate advancement; unfavorable phases retard progress.

The reviewer has no serious disagreement with Mr. Huntington's concept of an evolutionary urge guided and directed by heredity, environment, and culture. He does question the specific rôles assigned these guiding factors. He feels that Mr. Huntington's concept of culture is hardly mature when on page 139 there is reference to "a type of artificial culture based on wrong principles." It does not seem that Mr. Huntington has demonstrated the qualities of kiths to be hereditary rather than cultural. It is hard to believe that environment exercises the degree of physical and mental selectivity suggested by Mr. Huntington.

But complete analysis and criticism of this tremendous work are here impossible. The reviewer can only recommend that the book be read. While the reader may alternately enthuse and writhe, he will never be bored, for there is not a dull line.

While a work of the scope of *Mainsprings of Civilization* reaches far beyond the bounds of a single discipline, still for many working in other fields Ellsworth Huntington is the voice of American geography. Furthermore, there is a wide circle of laymen who read his works with pleasure and conviction. It therefore behooves American geography to make its position clear: to support Mr. Huntington's approach and conclusions or to make evident a disassociation.

Modified as his position may be from that of his precursors of fifty years ago, Mr. Huntington as a geographer is still the leading exponent of environmentalism. The word has been generally in bad repute among geographers for some years. Some have sought to escape its stigma by circumvention in terms; a few have departed so widely as to forget that every culture operates within a natural milieu. Mr. Huntington backs his convictions with learning and a prodigious amount of digging. It will take more than an obscure philosophical paragraph or a few cleverly turned phrases to refute him in the minds of a wide circle of readers. Careful appraisal of his work by similarly meticulous methods may well yield results commensurate with the effort.

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The Ten Grandmothers. ALICE MARRIOTT. (306 pp. Norman, Okla. University of Oklahoma Press, 1945.)

Although this is a book on ethnology, it is peculiarly appropriate to review it here because it applies to ethnological data the basic method of archaeology, viz., the method of time perspective. Archaeology in general analyzes its findings into strata or periods. It is not uncommon to have such sequences as an old culture as a base, a transitional period wherein new contacts are traced out, and a new period of assimilation, reorganization, and recreation. This method focuses attention squarely on one of anthropology's basic problems, the dynamics of culture. Miss Marriott has employed this method with gratifying results in presenting valuable data on the Kiowa Indians of Oklahoma.

Four periods in tribal history are presented: (1) the aboriginal culture, (2) the time when the buffalo were vanishing and one might say there was no economic base, (3) the time when the buffalo were gone and the Kiowa were settled on their reservation, and (4) the contemporary scene, with the old and new side by side. The first period extends from 1847 to 1869. It deals with war and the buffalo hunt, family life and child-rearing, etiquette, jokes, deviant behavior, property concepts, religion and the acquisition of supernatural power, and the behavior of the medicine man —especially the character of old Sitting Bear. He was not only a great medicine man, but a powerful warrior and chief as well. During the second period, 1869–1883, the army brought the Kiowa "under control" by herding them into a horse corral for an entire winter. During that terrible year they were counted day by day, a miserable reminder of their diminishing numbers and initiative, and a procedure strangely reminiscent of today's concentration camps. Then there followed reservation confinement and the first acquaintance with schools. The third period, 1884–1910, saw the Kiowa making desperate efforts to adjust and to understand the new ways imposed upon them one after another in bewildering succession: such institutions as allotments, white medical practices, and monogamy, among others. In the fourth period, 1910–1944, the Kiowa have established a working relationship to our culture. The young people go off to school, but, while the new culture has molded them to its pattern, when they come home they have a sense of belonging there too. The old values still have fundamental meaning for them, along with the new.

Miss Marriott presents her material in the form of episodes or stories. Kinship data are integrated painlessly by following the activities of two family lines for a hundred years. There are Kiowa versions of historical incidents involving Whites and Kiowa. A Kiowa gives his own view of polygyny so that it seems right. The author records the words of her informants and interpreters so faithfully that she conveys their literary and oratorical style. This gives a considerable insight into their philosophical thought that is a very unusual feature of the book. I feel from my experience with the Kiowa that she has caught the true spirit of Kiowa culture.

By treating the material in terms of the time-perspective method, some very interesting aspects of Kiowa culture development come to light. The old picture shows the essential harmoniousness and balance of Kiowa culture, the willingness to be tolerant even of the most abnormal behavior, and a sense of group belonging that yielded considerable personal security for its members and gave the group cohesiveness and strength.

In the transitional phase we see the culture fighting for its life, defending itself against powerful outside pressures. In the traumatic period, 1869–1883, they tried all their supernatural resources to stop the wrecking of their culture (cf. "Hanging the Red Blanket," etc.). In 1884–1910, the desperate search is extended beyond their own borders. In peyote, revealed to them by the Comanches, they found partial satisfaction. They also considered the Ghost Dance. A messenger was sent to see Wovoka personally, but Wovoka's manner was unconvincing and he felt that this was not a true prophet. So the Ghost Dance was rejected. Onto this scene of misery and frustration came the Christian

faith, adding confusion, though it was helpful in an attempt to put down a native sorcerer, Snapping Turtle. Snapping Turtle was a particularly oppressive terrorist. Because of his machinations, the pressures of the Church, and the new cults, there prevailed an agony of doubt.

Today, at last, the tribe has reached a more peaceful period. Though it still contains individuals raised under the most widely divergent conditions, a considerable area of common ground has been maintained so that young and old are not gravely out of touch with each other. Nothing better portrays the achievement of the Kiowa in facing the realities of their modern life than the poignant episode "Buffalo Grass." Old Spear-Woman learned that there were buffalo kept somewhere in a park. She persuaded her granddaughter to drive her there, so that after so many years she might look on buffalo again. She wore her finest clothes and special face paint to show her respect for the buffalo. At the park, the old rippling, running buffalo grass instantly caught her dim eye. She stood up in the car and called to the herd as the women had always done, clear and high, and then sang to them a song recalling happier days of old acquaintance. The herd approached at her call, but when they heard the song they were puzzled and broke apart, shuffling and snorting. "Then she saw. They were yearlings, little more than calves. And she had been singing to them about the old days . . . she began to laugh. . . . 'Of course you don't understand my singing. . . . You're just calves. You don't remember. You were born inside the fence, just like my own grandchildren'."

This is Spear-Woman's personal victory over the appalling hardships suffered, a deep understanding of the changes wrought during her lifetime. But the episode also symbolizes her victory in another way, and that of Kiowa culture itself. Spear-Woman now understood certain fundamentals of the western society that had almost engulfed them. She understood that the Whites were not like the Kiowa, that they had different values. For them it seemed a normal thing to confine the buffalo, and to herd Kiowa and other people into a horse corral. These were the kinds of human values they had. How prophetic of Dachau! Anthropology here yields one of its great rewards, that we can see ourselves as others see us, through the eyes of those we study.

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Excavations at the Old Lyme Shell Heap. ALEXIS A. PRAUS. (Bulletin of the Archaeological Society of Connecticut, No. 13. Yale Peabody Museum, New Haven, 1942.)

The Indian River Village Site. EDWARD H. ROGERS. (Bulletin of the Archaeological Society of Connecticut, No. 15. Yale Peabody Museum, New Haven, 1943.)

The South Woodstock Site. ALEXIS A. PRAUS. (Bulletin of the Archaeological Society of Connecticut, No. 17. Yale Peabody Museum, New Haven, 1945.)

The monographs under review consist of detailed reports on three archaeological sites in Connecticut. They are reviewed in the order in which the sites they describe seem to have been occupied, viz., the South Woodstock site, the Old Lyme site, and the Indian River site. The two papers by Praus are fairly uniform in their presentation of the data. The one by Rogers differs principally in the choice of emphasis. Praus emphasizes the projectile points and applies the classificatory system used by Byers and Johnson in handling similar material from Massachusetts.[1] Rogers places his emphasis upon the ceramics and employs a classificatory system well worth consideration by others working with similar pottery.

The South Woodstock site is described as a village situated upon a well-drained knoll in the northeastern corner of Connecticut. In contrast to the other two sites, the South Woodstock site is devoid of refuse in the form of marine shells. Praus describes post molds, stoned and unstoned fireplaces, and two varieties of refuse-filled pits. Fifteen pits are called "Council Pits" on the basis of the inclusion of fire-broken artifacts. One group of post molds suggests part of a circular dwelling. One disintegrated burial also occurs. Included in the text are maps and diagrams of the excavated area. Photographic plates show the site, the methods of excavation, and objects in situ.

Praus presents the data from the extensive excavations and surface collection made by Arthur Basto, and the less extensive excavations made by Praus for the Yale Peabody Museum in 1940. The excavated specimens are treated as one collection. The surface collection is handled separately and then compared with the excavated one. Many tables are used in the analysis but no significant differences could be found between the two collections. In both collections stemmed projectile points are found to be more numerous than the stemless varieties. The vertical distribution within the site indicates that the stemless trianguloid points increase from the bottom to the top of the deposit. The stemmed points decrease relatively as the top of the deposit is reached but still outnumber the stemless ones.

Praus uses the term "type" more loosely than do some other writers. The types are based upon readily apparent characteristics. He is justified by the lack of adequate comparative material which might furnish clues to the criteria that are important as time markers and links with other cultures. The specimens other than projectile points are covered in descriptive paragraphs because of the lack of sufficient numbers for statistical purposes. Line drawings and photographic plates are adequate supplements to his descriptive analysis of the nonceramic material.

The excavations yielded 156 grit-tempered sherds with plain, fabric-marked, net-impressed, incised, punctated, and single-cord-impressed surfaces. The sherds indicate simple Woodland style vessels; some have straight rims and others flaring rims. The surface collection contains 161 sherds, most of which are too badly eroded to permit a valid comparison. It is worthy of note that a few collared rims suggestive of traditional Iroquois types occur. Grit temper seems to have been the rule. Four sherds contain particles of graphite. The cursory manner in which Praus treats the ceramics might be overlooked had he included some illustrations of the sherds. It is difficult to compare the data with those from other sites, especially the Indian River site.

In drawing his conclusions Praus handles the available data carefully and concludes that the South Woodstock site is more closely related to the Coastal aspect than to the Owasco aspect. He would include the South Woodstock site along with the Old Lyme site and the Menunketisuck site as part of the Coastal aspect, recognizing a close kinship to the Nipmuck aspect of Massachusetts as well. In terms of time he equates the upper level of the South Woodstock

[1] Douglas S. Byers and Frederick Johnson, *Two Sites on Martha's Vineyard*, Papers of the Peabody Foundation for Archaeology, Vol. 1, No. 1, Phillips Academy, Andover, Massachusetts, 1940. See also review by writer in *American Anthropologist*, Vol. 44, No. 1, 1942, pp. 125–127.

site with the Old Lyme site. He feels the site is prehistoric and notes that the surface collection indicates contact with the Iroquois.

The Old Lyme site is described by Praus as a shell deposit, composed largely of oyster shells, located on the Connecticut coast opposite Orient Point, Long Island. Praus was not the first to investigate the site. His paper is concerned primarily with the excavations carried on by him in 1940 for the Yale Peabody Museum. He describes the strata, shell pits, black soil areas, fireplaces, hearths, firestones, and burials in detail. Maps and diagrams augment his descriptions. One peculiarity of the site is the absence of well-defined and deep refuse pits. Those described are shallow, and some appear to be mere hollows filled with shells. Photographs and line drawings illustrate the features and methods of excavation.

The projectile points are classified and described in the same manner as in his report on the South Woodstock site. One table is used. Line drawings illustrate the idealized types and a photographic plate shows the actual specimens. The range of types is not as great as that at the South Woodstock site. A larger proportion of trianguloid points without stems is present. As in the other paper the remaining artifacts are given a more cursory treatment.

The site produced 300 potsherds. Praus finds that 75 per cent are shell-tempered and the remainder grit- or mineral-tempered. The author sees fit to separate the pottery of this collection on the basis of temper and then to classify the sherds into "Sub-Groups" under each of the two aplastics. The reviewer has not found this method of much value in handling similar material from sites on Long Island. To classify so few sherds in this way makes for more confusion than clarity because the decorative techniques and surface finishes seems to be independent of the tempering material. Had the descriptions been supplemented by tables and good illustrations a more thorough knowledge of the pottery might be obtained by the reader. One figure illustrates some of the sherds, but the detail is far from adequate and no attempt is made to show the range of variation within a "Sub-Group." The reader cannot make a table of the ceramic traits from the data because they are presented inconsistently. Praus does not always say how many sherds bear certain markings. In general character, the pottery would seem to resemble that found at the South Woodstock site. It should be added that the author feels that "a detailed technological study of Connecticut ceramics is something to be anticipated in the future."

Praus finds no significant concentrations of artifacts in the site. There is no typological change from the bottom to the top of the site or, at least, the small number of specimens found fails to show it. The author compares the site with the Coastal aspect and finds it to be a part of it. Chronologically, Praus places the site at the beginning of the protohistoric period.

Rogers describes the Indian River site as a series of shell middens and burial areas located on Long Island Sound near New Milford, Connecticut. According to local traditions and records the area was known as Wepowage and was occupied until 1659 by a group of Indians who were presumably of Algonkian linguistic affiliation. The author makes no mention of their tribal name. Rogers and his associates, all nonprofessionals, excavated the major portion of the site piecemeal over a period of years. The deposits marking the site are composed of broken clam shells, stained earth, and charcoal. A series of separate camp or village sites is indicated, but no attempt is made to determine whether they were occupied at the same time level. Pits used for refuse, storage, and fires are common. Approximately 150 burials were found. Rogers finds that "the majority of the burials faced the orbit of the sun while only two graves were found with the head facing in a northerly position." Grave goods are scarce. One postmold pattern indicative of a circular house about ten feet in diameter is described.

The nonceramic artifacts are described in a rather cursory fashion. This is particularly true of the projectile points which receive so much attention from Praus. Generally speaking, trianguloid points without stems seem to be the predominating variety, although several stemmed forms occur. Rogers makes an outstanding contribution in his analysis of the pottery. It is to be regretted that the projectile points are not handled in a like manner.

It should be noted that the pottery used in the analysis is a selected sample, the majority of the body sherds being disregarded. The Indian River site is characterized by a great variety of sherds. The author breaks the pottery down into what he calls "Classes" and describes the features independent of class. The types of markings are then enumerated and described. A table itemizes the characteristics of each of the 153 sherds. This is followed by statistical groupings in another table. Excellent photographic plates illustrate the restored vessels and individual sherds. Each illustrated specimen is described in detail under "Explanation of Plates."

The vessels are divided into three classes: Class 1 is shoulderless with conical bottoms, and has straight rims with "knife-like" lips. The bulk of the sherds belong to Class 1 vessels. Class 2 is shouldered with rounded bottoms, constricted necks, and flaring or collared rims. Vessels of Class 2 are found to be more artistically decorated. Class 3 vessels have square mouths and are called "cornice ware." Very few vessels of the latter type were found, and Rogers has reason to believe they are of exotic origin. On Class 3 vessels the decoration was applied with the edge of a quahog (clam) shell.

The sample collection shows 65 per cent shell temper and 35 per cent grit and indeterminate. Rogers finds the following surface markings: cord-wrapped paddle, scarification, stamping (cord and dentate), single cord, shell marking (quahog and scallop), broad-line incision, fine-line incision, punctation, curved rocker stamp, spattering (similar to rain drop impressions in mud), elongate punch strokes, and nodes.

Rogers takes the presence of a small piece of copper, a scrap of iron, and half a glass bead as evidence that the site was abandoned early in historic times. He states that wherever he finds clam shells predominant in the refuse at a site pottery is abundant. Sites with oyster shells predominating usually produced little pottery. Praus finds little pottery at the Old Lyme site, which is characterized by oyster shell refuse. The South Woodstock site is an inland site devoid of marine shells. The application of Roger's rule to sites along the New England coast may give us an important correlation between diet and time level.

It will have been noted that I have devoted most of the review to the analyses of the projectile points and the pottery. The authors themselves make the same emphasis. Because the other artifacts appear in such small quantities, it is doubtful whether any valid interpretations can be made at this writing on the basis of the presence and absence of other traits.

The sequence of projectile points, starting with a variety of stemmed forms in the earlier sites and ending with a predominance of stemless trianguloid ones in the later sites, is reflected throughout the archaeologically known Northeast. I have found it to be true on Long Island, as well. Neither is the ceramic sequence unique; I find a close similarity to the pottery of western Long Island.[2]

It would appear that on Long Island and along the New England coast the trend in the ceramics was toward a transition from purely Woodland forms into those characteristic of the Iroquois. This is paralleled in the tempering material, which is grit in the early sites and shell in the later ones. The earlier sites contain simple forms and a narrow range of surface finishes and decorative techniques. Then there is a period of great variety in shape, finish, and decoration as exemplified by the Indian River site. The final stage constitutes the virtual obliteration of the Woodland ceramic tradition. Some late sites awaiting publication exhibit shell-tempered vessels with plain-surfaced globular bodies, constricted necks, high collars with castellations, and occasional square mouths. The rims generally bear incised decoration on the collared area, although a large proportion harks back to the Woodland tradition of stamping. In the latter case, the edges of marine shells replace the formerly ubiquitous dentate or rocker stamp. The beginning of the final stage is suggested at the Indian River site by the presence of what Rogers terms "Cornice Ware" or "Class 3" vessels.

The monographs by Praus and Rogers form an important addition to the published data on the archaeology of New England and the rest of the northeastern coastal region. Along with other recently published analyses, they will form a firm basis for future comparative studies. The authors and the Archaeological Society of Connecticut are to be congratulated upon the splendid groundwork already accomplished.

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[2] Carlyle S. Smith, "Clues to the Chronology of Coastal New York," AMERICAN ANTIQUITY, Vol. 10, No. 1, July, 1944, pp. 87–98.

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The following abbreviations appear in the list which follows:

AA, American Anthropologist
AMNH, American Museum of Natural History
BAE-B, Bureau of American Ethnology
CNMA, Carnegie Notes on Middle American Archaeology and Ethnology
MAS, Massachusetts Archaeological Society
PMAS, Papers of the Michigan Academy of Science, Arts, and Letters
PM-P, Papers of the Peabody Museum of Archaeology and Ethnology
SI-R, Smithsonian Institution, Annual Report
SJA, Southwestern Journal of Anthropology
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